

THE
AUSTRALIAN ARMY MEDICAL
SERVICES

IN THE
WAR OF 1914-1918

VOLUME III

BY
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B.A., M.B., Ch.B. (Camb.)

With 85 illustrations, graphs, and diagrams

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PREFACE

THIS volume completes the Official History of the Australian Army Medical Services in the War of 1914-18. The first volume after sketching the evolution of the Medical Service dealt chiefly with the campaigns in Gallipoli, Sinai-Palestine, and New Guinea, and the related developments in Australia—the section dealing with the Middle East being written by Major-General R. M. Downes, that concerning the Pacific by Colonel F. A. Maguire and Captain R. W. Cilento, and the remainder by the present writer. The second volume—for which the present writer was wholly responsible—dealt, on somewhat broader lines, with the medical history of the warfare on the Western Front in 1916-18 as seen in the experience of the Australian Imperial Force. A particular study was made of technical developments in evacuation, and in the immediate treatment of wounds and the prevention of disease, and also of the medical administration of the Director of Medical Services of the A.I.F., Surgeon-General Sir N. R. Howse.

In each of those two volumes the problems were discussed as they evolved in the course of military events—the work was, in short, as planned, a history of the medical problems of the A.I.F. But while that plan was of special value in making clear those problems that were solved largely by administrative action, some of the most important, even of these, called for separate treatment, and it is with these, and with the final experiences of the A.A.M.S.—and of the nation so far as this service is concerned—that the present volume deals. Its arrangement is sketched in the introduction.

In its conception, its design, and its execution, the medical history of the Australian forces in the First World War has been part of the general project of the Australian Official History.¹ It thus came within the responsibility of the General

¹ Dr. Bean's original scheme, approved by the Government, envisaged three classes of work: The national history; professional histories, regimental histories. The writing of the professional histories (medical, engineering, veterinary, legal, etc.) was to be undertaken by the professions if they desired it, in which case they would receive certain help from the Defence Department. Eventually none was undertaken.

Editor, Dr. C. E. W. Bean; and the Medical Editor—the present writer—has thus had the inestimable advantage of his guidance, inspiration, and scholarly oversight. It is a duty which the writer owes—not only to himself but, as Medical Editor, to the Service and the profession in Australia—to insist upon here recording his deep obligation to Dr. Bean. Much more he would wish to say—those who have had a responsible part in the making of the Australian History of the war will themselves readily make good the omission. It is, however, necessary, since it concerns the author's personal responsibility, to add that, while every single chapter—indeed almost every paragraph—owes much to the General Editor, this has involved no sense of restraint or censorship, but rather a stimulus to self-expression.

This, it need hardly be said, does not imply the hope that even serious errors and omissions, especially in matters of professional judgment and knowledge will be absent. As to professional lapses, it should be noted that the decision not to employ a group of technical specialists, but to entrust most of the technical as well as military studies to the general writers, was made deliberately by those who organised the work, their belief being that even if it lost something in scientific accuracy and completeness it would gain in the integration of its elements into an organic whole. This decision naturally limited the field that could be covered.

The nature of the main omissions, which were deliberate, and some of the reasons for them have been made clear in the preface and text of this and the previous volumes.

One other word, however, is necessary. When the writing of this history was begun in 1922 the Editor enquired, with a view to determining his own actions, whether a history of the Australian Branch of the British Red Cross Society in the war was contemplated (as "medical collator" in 1918-19 he had been made by General Howse responsible for ensuring the col-

but, at the request of the B.M.A. the Government decided to appoint a medical historian and to be responsible for its production, the work and publication being kept entirely separate from that of the other histories. The task, however, had not gone far before considerations of convenience and economy caused the Minister to reverse this decision, the work being finally placed under a board (Gens. Howse and White and Dr. Bean), and under the general editorship of the last-named.

lection and collation of relevant material). The reply informed him that the history of the Society was being undertaken by itself. The Editor of the present history was thus relieved from responsibility other than to ensure that the service of "Voluntary Aid" fitted into its place in the work of the Army Medical Services. However no "scientific" history of the work of the Society, in all its bearings, has yet been produced.² The writer may perhaps be permitted to express his regret at this result and his hope that, in the case of the present war, such a history, and that of "Voluntary Aid" in general, may be embodied in a volume worthy of the subject.

It is impossible adequately to acknowledge the assistance of all those whose support and co-operation have contributed to the completion of this work; but the writer must record his particular appreciation of the patience of the Government, the Army Medical Service, and the medical profession of Australia in their attitude towards the long delay entailed. To them also and to Major-General R. M. Downes, till lately D.G.M.S., A.M.F., I tender my very sincere thanks that they have enabled me to see the job through.

The writer owes a particular debt to the staff of the Australian War Memorial, and of the Official Historian, as both helpers and friends through fair weather and some not so fair. Mrs. W. B. Rees has acted as my assistant with this present volume. Mr. Withers is overseas in charge of the medical records for the second A.I.F. Mr. J. Balfour has seen the volume through the press and in addition has again saved many slips. Mr. W. S. Perry, who was responsible for the maps of the previous volumes has done the graphs for this one. Miss Mary Ordish, my helper throughout, is again responsible for the indexing of this present volume. At the War Memorial the Director (Lt.-Colonel J. L. Treloar) and Acting Directors (Mr. T. H. E. Heyes and Mr. A. W. Bazley) have done much towards making the work possible, and the staff, collectively and individually has been of the utmost help throughout the writing of the history. It will not, I hope, seem invidious if I record the help given me, especially with the German histories,

² The place of such a history has in part—but only in part—been filled by the fascinating *Story of the Red Cross* by Joan and Daryl Lindsay, written for and published by the Australian Red Cross Society.

by Miss Vera Blackburn, with figures by Mr. A. J. Hanley, and with illustrations by Mr. Eric Keage.

In connection with the peculiarly difficult questions relating to the "aftermath" of the war the Principal Medical Officers of the Repatriation Commission (Colonels C. A. Courtney and Kenneth Smith) and the Commission itself have been wholly ingenuous and co-operative—so, indeed, as to earn, as I believe, the thanks not only of myself but of the Returned Soldiers and of the Australian public.

The many calls for help made to the Officer-in-Charge of the Base Records Department (Mr. A. J. Bowman), the Librarian of the New South Wales Branch, B.M.A., (Miss M. Rolleston) and Mr. R. K. Peacock, Librarian to the Department of the Army, Melbourne, have never failed to bring helpful response. The Commonwealth Bureau of Census and Statistics most kindly worked out or verified the more elaborate tables of figures.

The personal erudition and the departmental resources of the Commonwealth Director-General of Health (Dr. J. H. L. Cumpston) have at all times been fully available, and have been freely drawn upon.

I am indebted to Mr. L. F. Fitzhardinge, of the Australian National Library, for an extensive research into classical and modern literature on the evolution of medical aid and humanitarian practice in warfare: the results of this enquiry are in part embodied in the two final chapters. So far as the last chapter concerns the Geneva and Hague Conventions, its factual content was most kindly reviewed by Lieut.-Colonel W. R. Hodgson, Secretary to the Department of External Affairs.

I should also express my appreciation as Editor and Author of the obvious care and sincerity of the reviewers of the previous volumes. The constant support and co-operation of our *Medical Journal of Australia* calls for a particular word of thanks.

The staff of the Halstead Press have earned my gratitude for their help and forbearance.

Finally I would like to make some public acknowledgement to my wife; who has had full share of the hardships and incon-

veniences, and none of the fun involved in the writing of a medical history.

.To my successor, whoever may be selected our medical historian for the Second World War, I give hail—and farewell! The Australian soldier and the Australian Army Medical Service are worthy of everything that you can put into the task.

A.G.B.

AUSTRALIAN WAR MEMORIAL,

25th May, 1942.

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ABBREVIATIONS

A.A. & Q.M.G.	- -	Assistant Adjutant and Quartermaster-General
A.A.G.	- - - -	Assistant Adjutant-General.
A.A.H.	- - - -	Australian Auxiliary Hospital.
A.A.M.C.	- - - -	Australian Army Medical Corps.
A.A.N.S.	- - - -	Australian Army Nursing Service.
A.A.S.C.	- - - -	Australian Army Service Corps.
A. & D. Books	- -	Admission and Discharge Books.
A. & N.Z.A.C.	- - -	Australian and New Zealand Army Corps.
A.C.C.S.	- - - -	Australian Casualty Clearing Station.
A.C.I.	- - - -	Army Council Instructions.
A.D.H.	- - - -	Australian Dermatological Hospital.
Admin. H.Q.	- - -	Administrative Headquarters.
A.D.M.S.	- - - -	Assistant Director of Medical Services.
A.D.O.S.	- - - -	Assistant Director of Ordnance Services.
A.D.S.	- - - -	Advanced Dressing Station.
A.F.A.	- - - -	Australian Field Artillery.
A.F.C.	- - - -	Australian Flying Corps.
A.G.	- - - -	Adjutant-General.
A.G.H.	- - - -	Australian General Hospital.
A.I.B.D.	- - - -	Australian Intermediate Base Depot.
A.I. Bde	- - - -	Australian Infantry Brigade.
A.I.C.	- - - -	Australian Instructional Corps.
A.I.F.	- - - -	Australian Imperial Force.
A.L.H.	- - - -	Australian Light Horse.
A.M.C.	- - - -	Army Medical Corps.
A.M.D.	- - - -	Army Medical Departments of the War Office.
A.M.F.	- - - -	Australian Military Forces.
A.M.S.	- - - -	Army Medical Service, or Staff.
A.N. & M.E.F.	- - -	Australian Naval and Military Expeditionary Force to New Guinea.
A.P.M.	- - - -	Assistant Provost Marshal.
A.Q.M.G.	- - - -	Assistant Quartermaster-General.
A.R.C.S.	- - - -	Australian Red Cross Society.
A.S.C.	- - - -	Army Service Corps.
A.S.H.	- - - -	Australian Stationary Hospital.
A.T.S.	- - - -	Antitetanic serum.
A.W.L.	- - - -	Absent Without Leave—officially “illegally absent”.
B.E.F.	- - - -	British Expeditionary Force.
B.M.A.	- - - -	British Medical Association.
B.R.C.S.	- - - -	British Red Cross Society.
B.W.I.	- - - -	British West Indies.
C.A.M.C.	- - - -	Canadian Army Medical Corps.
C.C.H.	- - - -	Combined Clearing Hospital.
C.C.S.	- - - -	Casualty Clearing Station.

C.E.	- - - - -	Chief Engineer, Headquarters Army or Army Corps.
C.G.S.	- - - - -	Chief of the General Staff.
C.-in-C.	- - - - -	Commander-in-Chief.
C.O.	- - - - -	Commanding Officer.
C.R.E.	- - - - -	Commanding Royal Engineers (includes Australian Engineers).
D.O.C.	- - - - -	Died "Other Causes" (<i>i.e.</i> than wounds).
D.O.D.	- - - - -	Died of Disease.
D.O.I.	- - - - -	Died of Illness or Injury.
D. of S.	- - - - -	Director of Supplies.
D. of T.	- - - - -	Director of Transport.
D.O.W.	- - - - -	Died of Wounds.
D.A.A.G.	- - - - -	Deputy Assistant Adjutant-General.
D.A.A. & Q.M.G.	- - - - -	Deputy Assistant Adjutant and Quartermaster-General.
D.A. & Q.M.G.	- - - - -	Deputy Adjutant and Quartermaster-General.
D.A.C.	- - - - -	Divisional Ammunition Column.
D.A.D.M.S.	- - - - -	Deputy Assistant Director of Medical Services.
D.A.G.	- - - - -	Deputy Adjutant-General.
D.A.H.	- - - - -	Disordered Action of the Heart.
D.A.Q.M.G.	- - - - -	Deputy Assistant Quartermaster-General
D.C.S.	- - - - -	Divisional Collecting Station.
D.D.M.S.	- - - - -	Deputy Director of Medical Services.
D.G.A.M.S.	- - - - -	Director-General, Army Medical Service.
D.H.Q.	- - - - -	Divisional Headquarters.
D.M.C.	- - - - -	Desert Mounted Corps.
D.M.S.	- - - - -	Director of Medical Services.
D.Q.M.G.	- - - - -	Deputy Quartermaster-General.
D.R.S.	- - - - -	Divisional Rest Station.
E.E.F.	- - - - -	Egyptian Expeditionary Force.
E.M.O.	- - - - -	Embarkation Medical Officer.
E.P.T. Depot	- - - - -	Early Preventive Treatment Depot.
E.P.I.P. Tent	- - - - -	European Private's Indian Pattern Tent.
Fld. Amb.	- - - - -	Field Ambulance.
G.H.Q.	- - - - -	General Headquarters.
G.O.C.	- - - - -	General Officer Commanding.
G.O.C. in C.	- - - - -	General Officer Commanding in Chief.
G.R.O.	- - - - -	General Routine Order.
G.S.O.	- - - - -	General Staff Officer.
G.S. Waggon	- - - - -	General Service Waggon.
G.S.W.	- - - - -	Gunshot wound.
H.E.	- - - - -	High explosive
H.M.S.	- - - - -	His Majesty's Ship.
H.M.T.	- - - - -	His Majesty's Transport.
H.Q.	- - - - -	Headquarters.
H.S.	- - - - -	Hospital Ship.
I.C.C. Bde.	- - - - -	Imperial Camel Corps Brigade.
I.C.T.	- - - - -	Inflammation of Connective Tissues.
I.G.C.	- - - - -	Inspector-General of Communications.
Inf.	- - - - -	Infantry.
I.M.S.	- - - - -	Indian Medical Service.
K. (German Statistics)	- - - - -	Average rate.

K.I.A.	- - - - -	Killed in action.
L.H.	- - - - -	Light Horse.
L. of C.	- - - - -	Lines of Communication.
M.	- - - - -	Missing.
M.A.C.	- - - - -	Motor Ambulance Convoy.
M.D.	- - - - -	Military District of Australia.
M.D.S.	- - - - -	Main Dressing Station.
M.E.F.	- - - - -	Mediterranean Expeditionary Force.
M.G.	- - - - -	Machine-gun.
M.O.	- - - - -	Medical Officer.
M.O.H.	- - - - -	Medical Officer of Health.
M.R.C.	- - - - -	Medical Research Committee of National Insurance.
M.T.	- - - - -	Mechanical Transport.
N.A.D.	- - - - -	No appreciable disease.
N.C.O.	- - - - -	Non-commissioned Officer
N.S.W.	- - - - -	New South Wales.
N.T.O.	- - - - -	Naval Transport Officer.
N.Y.D.	- - - - -	Not yet diagnosed.
N.Y.D. Gas	- - - - -	Not yet diagnosed Gas.
N.Y.D.N.	- - - - -	Not yet diagnosed Nervous.
N.Z.	- - - - -	New Zealand.
N.Z. & A. Div.	- - - - -	New Zealand and Australian Division.
N.Z.E.F.	- - - - -	New Zealand Expeditionary Force.
N.Z.M.C.	- - - - -	New Zealand Medical Corps.
O.C.	- - - - -	Officer Commanding
O.R.	- - - - -	Other Ranks.
O.T.B.	- - - - -	Overseas Training Brigade.
P.B.	- - - - -	Permanent Base (duties).
P.D.M.S.	- - - - -	Principal Director of Medical Services.
P.H.T.O.	- - - - -	Principal Hospital Transport Officer.
P.M.L.O.	- - - - -	Principal Military Landing Officer.
P.M.O.	- - - - -	Principal Medical Officer.
P.N.T.O.	- - - - -	Principal Naval Transport Officer.
P.O.W.	- - - - -	Prisoners of War.
P.U.O.	- - - - -	Pyrexia of uncertain origin.
Q.A.I.M.N.S.	- - - - -	Queen Alexandra's Imperial Military Nursing Service.
Q. Branch or "Q"	- - - - -	Quartermaster-General's Branch.
Q'land, or Q.	- - - - -	Queensland.
Q.M.	- - - - -	Quartermaster.
Q.M.G.	- - - - -	Quartermaster-General.
R.A.F.	- - - - -	Royal Air Force
R.A.A.F.	- - - - -	Royal Australian Air Force.
R.A.M.C.	- - - - -	Royal Army Medical Corps
R.A.M.C. (T.C., or T.)	- - - - -	Royal Army Medical Corps (Temporary Commission).
R.A.M.C. (T.F.)	- - - - -	Royal Army Medical Corps (Territorial Force).
R.A.M.C. (S.R.)	- - - - -	Royal Army Medical Corps (Special Reserve).
R.A.N.	- - - - -	Royal Australian Navy
R.A.P.	- - - - -	Regimental Aid Post
R.A.S.C.	- - - - -	Royal Army Service Corps.
R.M.O.	- - - - -	Regimental Medical Officer.

ABBREVIATIONS

R.N.	- - - - -	Royal Navy.
R.N. Div.	- - - - -	Royal Naval Division.
R.P.	- - - - -	Relay Post.
S. Aust., or S.A.	- - - - -	South Australia.
S.B.R.	- - - - -	Small Box Respirator.
S.D.O.	- - - - -	Senior Dental Officer
S.I.W.	- - - - -	Self inflicted wound.
S.M.O.	- - - - -	Senior Medical Officer
S.N.L.R.	- - - - -	Services no longer required.
S.O.A.D.S.	- - - - -	Staff Officer Australian Dental Service.
S.T.A.	- - - - -	Septic Traumatic abrasions.
T.A.B.	- - - - -	Mixed Vaccine Typhoid and Paratyphoids A and B.
Tas.	- - - - -	Tasmania.
Temp.	- - - - -	Temporary.
T.F.	- - - - -	Territorial Force
T.H.S.	- - - - -	Temporary Hospital Ship.
U.R.T.I.	- - - - -	Upper Respiratory Tract Infection.
V.A.D.	- - - - -	Voluntary Aid Detachment.
V.D.	- - - - -	Venereal Disease (also, Volunteer Officers' Decoration).
V.D.H.	- - - - -	Valvular Disease of the Heart.
Vic.	- - - - -	Victoria.
W. Aust., or W.A.	- - - - -	Western Australia
Yeo.	- - - - -	Yeomanry.
Y.M.C.A.	- - - - -	Young Men's Christian Association

INTRODUCTION

THIS volume begins with a detailed study of four of the outstanding problems or "conundrums", technical and professional, that faced the medical service and profession in the war. This is followed by a general survey of the scientific foundations of medical work in the First World War, illustrated by one of its highlights—the "discovery" of trench fever—and by a bird's-eye view over the "scientific" work done by the A.A.M.C. After this, complementary to the considerable study made in *Volume II* of the immediate pathology and surgery of war wounds, come several brief studies, by experts, of certain aspects of the reparative surgery.

Certain clinical studies

Section II contains an account of certain other medical services. From material provided there has been compiled a historical and technical survey of the evolution and work in the war of the medical service with the Royal Australian Navy and a summary of the beginnings of medical service in the Australian Flying Corps. *Section III* gives an account of the work of certain specialist services—dental, pharmaceutical, nursing, massage—whose contribution, personal and scientific, to the main stream of medical service was, though subsidiary, of great practical and human interest and importance, but has hitherto received only general and incidental notice in these pages.

Navy and Air Force

Specialist services

Section IV picks up from previous volumes the story of the "invalid". From the technical side the ageing and death—in 1921—of the A.I.F. as a "Force" presented the medical profession in Australia with problems not less but from the professional and technical standpoint *more* difficult than those of its lifetime. It is said that death begins with birth, and so for the A.I.F. the *end of the war begins in* 1914, when H.M.A.T. Kyarra "repatriated" to Australia 201

The aftermath

officers and other ranks whose services were not of further use to the A.I.F. command, and of whom 169 constituted "medical problems". By the plan of *Volume II* the problem of the invalid was "passed for action" to this volume. When, in tracing the course of a casualty on the Western Front through the vicissitudes of evacuation from the front lines, we reached the Australian Intermediate Base in England, we pictured the convalescent soldier as passing through the toll-gate of the Medical Board, to be directed by the *ipse dixit* of the boarding officer hither, or thither: either to the training depots to re-train for the front, or (under the "six months' policy") to No. 2 Command Depot for return to Australia as an invalid. The first stream we then followed through the Overseas Training Brigade back to the front; the experiences and medical problems of the second belong to the present volume. Accordingly we pick up both the narrative and the technical study concerning the "invalid", following him from the "rough and tumble" of interim treatment overseas, through the vicissitudes of sea transport to Australia (the medical problems of which are a subject of detailed study); through provision—good and "not so good"—made in Australia to implement the intention of the six months' policy; and so to the "last scene of all"—the poignant social and service history, and the terrible—we may not diminish the word—technical problems of pensioning.

Section V furnishes, first, an historical background of figures relating to the whole war, beginning with the total casualties sustained by the belligerents, and passing to progressively more particular statement of the losses sustained by the Allies, by Great Britain and the dominions, and by Australia, and showing some experience of the aftermath. Finally, a *detailed clinical analysis* is made of the figures of mortality and morbidity comprising what may be termed the life-history of the A.I.F. This analysis is based on a nosological scheme not (so far as is known to the writer) heretofore attempted for any large body of morbidity statistics. All non-battle casualties are classified according to their aetiological association and (where possible) their immediate and direct *cause*. This is carried out with special reference to their "attribution to" or "aggravation by" war service—the basis of Australian pensioning. Tables showing the *recruiting* and *camp experience* in Australia are followed by a

complete analysis of *all non-battle casualties* sustained by the A.I.F. on the Western Front. Next come similar figures for *invalids returned* to Australia, and finally an analysis (on the same nosological basis and tabulation) of the clinical and pathological conditions for which *pensions* were paid in a selected year of post-war experience.

The *Epilogue* asks "quo vadimus?" and endeavours to answer this. It has been said in the introduction to *Section II* of *Volume II* that the fundamental responsibilities of the medical service are threefold—to the army, to the nation as a peaceful society, and to humanity. Because of the relative importance of these three mandates *within the war*, the third has so far received only incidental reference. But—in view of the fact that it alone, as a *permanent* element in human progress, links the history of medical service in this particular war directly with the immediate spiritual, cultural, and in some part the social, future of man—the last word is reserved for it. The question what is to be the future of the medical service, how will the three conflicting allegiances be served, especially in view of the "total" repudiation of the humane allegiance by the philosophy with which we are now at war, is examined as a problem in medical sociology. "The Red Cross: An End or a Beginning?" is the arresting title to an article in *The Lancet* on 8th January 1938. To this question in relation to the history of the Australian Red Cross Society in the First World War, and that of the future of medical service as a whole, we devote the last section of this last volume of this history.

SECTION I—SOME TECHNICAL PROBLEMS

CHAPTER I

CHEMICAL WARFARE

I

THE NATURE OF THE WEAPON AND ITS USE

THE Great War had been in progress for six months and the entrenched "attrition" line was in the initial stage of flux, when on April 22nd at 5 p.m. the "Second Battle of Ypres" was initiated by the discharge of the first German gas cloud (chlorine) against the French Colonial troops near Langemarck.¹

**The first
gas attack**

Timely, detailed and exact warning of the impending gas attack, and of the preparation by the Germans of respirators made from tulle, had been received by the British, French and Belgian Commands from spies and prisoners, but these had gone almost unheeded.² For the unfortunate troops, therefore, the surprise was absolute. Wholly unprotected and unprepared, the Turcos fled gasping and in terror,³ leaving a gap of nearly five miles between the French and

¹ Notes on the use of "gas"—and also rejection of the use—in past wars are given in *Appendix No 1*

Since December shells containing "tear gas" had been used by the Germans but these it would seem had gone unnoticed. But the use of "respirators" against "the fumes given out by bursting shells" is the subject of an illustration in the *Illustrated London News* of 3 Apr 1915.

² They were passed on to the divisions but air reconnaissance showed no sign of attack on the date then mentioned, April 15. Such records as are available serve to show that the chief reason for this was doubt by Allied officers whether the Germans would thus flout international law, and also their ignorance of civil scientific advances and incredulity regarding the possibility of using chemicals as a weapon on a large scale. The same military undervaluation of civilian co-operation and of "science" lost to the German High Command one of its best chances in the war. One of the first and most significant effects of the initiation of chemical warfare was to compel the mobilisation for military purposes of the resources, material and personal of civilian science and scientific industries.

³ "Within an hour Turcos (Algerian troops) were pouring into the (Canadian) M D S at Vlamertinghe . . . not one of them wounded, but haggard and in agony as the result of having been 'gassed'." "It is little wonder," the historian adds, "that those French 'native' troops that had not been immediately overcome broke under so novel and terrible an experience" (*War Story of the C.A.M.C. 1914-15* by Col J. G. Adam, M.D., F.R.S., pp 103 and 112)

British fronts. The German infantry, itself nervous as to the effects of the gas, did not thrust as far as it might and its penetration ended at the Ypres Canal. The Canadian Division, immediately south of the French, had not been directly attacked, and had held this line and formed a flank; but at 4 a.m. on the 24th a second gas cloud was released against them.

The Turcos had run with the cloud to disaster; the reaction of the Canadian troops to "gas" was that of educated and resourceful men fighting against things they at least partly understood. Within a few hours of the first gas attack on April 22nd, Canadian medical officers had diagnosed the nature of the gas and had suggested improvised means of defence.⁴ The Canadians had borne heavy attacks on April 23rd; and now—"using socks, handkerchiefs, towels, bandoliers and so forth soaked with tea, water or sodium bicarbonate" and holding all vital parts of their position while the gas cloud rolled past them, they retained the "captaincy of their soul", and therewith the "mastery of their fate".

Fortunately (says a Canadian Ambulance Commander) the supply was not unlimited and, after the gas cloud passed over, most of the men soon recovered from its effects.

By discipline and intelligence they saved the Channel ports, perhaps the war for the Allies.

The casualties through gassing, though heavy, were far less than those of the French native troops.

Further gas attacks were made on May 1st, 2nd, and 24th, against various parts of the British front, by which time some less primitive means of defence were devised.

Two questions at once confronted the British Command—of organising defence; and of retaliation. Pending decision on the latter the urgent duty of designing some means of protection

⁴ The War Diary of the A D M S. Canadian Division notes that the rumour of an attack by asphyxiating gases was mentioned at a meeting of the senior medical officers of the Divisions of the Corps on April 15. On April 22 Canadian medical officers near Ypres saw "a long cloud of dense yellowish-green smoke" and "agreed that it was in all probability the poisonous gas which we had heard the Germans talked of using . . . The gas reached us within half an hour and . . . we diagnosed it as largely chlorine". The diarist (Lieut.-Col. G. G. Nasmith, O C No 5—Canadian—Laboratory) notes on April 23 "Wrote G H Q direct, to save time, about chlorine and bromine gas which we had diagnosed at Ypres—suggested use of a pad soaked in Hypo-sulphite of soda." (*War Story of the C A M C*, p 105, *British Official History, France and Belgium 1915 Vol I*, p 165n)

against the cruel and unlawful weapon fell, perhaps not unnaturally, on the medical service. The immediate problem was comparatively simple—to diagnose the nature of the gas and improvise means to minimise its effects pending the development of an organised technical and military defensive. The dust and heat of a great battle made the task none the easier. The first “respirators” were simply face pads more or less sophisticated.⁵ Crude as they were and not less so the arrangements for their use by the troops⁶ they afforded a very definite measure of protection. But speaking generally the tactical success of “gas” was dramatic.⁷ The German Staff had not, however, prepared to exploit on a large scale the “surprise” effect of the new weapon, and the success was of little, except moral, account. Furthermore, for most of the summer the prevailing winds blew adversely for the Germans and gave several months of respite invaluable to the Allies.

Within a week Britain and France had decided on retaliation in kind as, by law, they were completely justified in doing. Thereafter, chemical warfare occupied an ever-increasing place in military operations and in the military imagination

⁵ A small laboratory was at once formed at G.H.Q. then in St. Omer, and Professor W. Watson put in charge. The eminent physiologist and bio-chemist, Professor J. S. Haldane, was called in to investigate and advise. Chlorine was identified and various suggestions made for improvised protection such as breathing through moist earth—as pigs had been observed to do.

On April 23, the D.G.M.S. from British G.H.Q. at St. Omer, issued instructions that during a gas attack men should cover their nose and mouth with handkerchiefs or cloths dipped in a solution of sodium bicarbonate which was to be kept ready for use in buckets in the trenches.

An appeal (independent it would seem of the Medical Department), was made, by Lord Kitchener through the Press, to the women of England for a million “respirators”, to what or whose design is obscure. These were made in a day—but they were useless, being composed of lint and cotton wool which when dry did not exclude “gas”, and when wet were almost impervious to air. On May 5 their use was prohibited by the D.G.M.S. A captured German “breath protector” gave the idea for the first official respirator “a long piece of black veiling folded on itself so as to contain a pocket, in the centre of which was placed a pad of cotton waste wrung out in a solution consisting of sodium hyposulphite 100 parts, sodium carbonate crystals (washing soda) 40 parts, glycerine 15 parts, and water 100 parts”. Pending delivery of these, “squares of flannel cloth and cap comforters” were issued on May 3 to be soaked in the solution. By May 15, 200,000 “black veil” respirators had been supplied and were being issued. Later these and the fabric cowl respirators, in turn, reached the A.I.F. on Gallipoli, but only a few tear bombs were used by the Turks. The great gas cloud of May 24 caught many men still equipped with the home-made pads, or ignorant of the method of using the official issue, and the casualties were heavy.

⁶ Men were known to place the pad on the chest—where the pain was felt! The provision of protective apparatus must obviously be implemented by exact organisation for distribution and instruction in its use.

⁷ The German gains in this battle, including the capture of “Hill 60”, left the Salient a heavy drain on British man-power.

of both sides. Offence and defence in gas gave scope for a battle of wits and of organising genius that was not surpassed in its intensity or significance.⁸

These occurrences opened up to medical science an almost unexplored field of research in the toxicology of poisonous gases, and in the pathogenesis, clinical pathology and symptomatology, and treatment of their effects. In close relation with these, it brought to the medical service, as an army department, new problems in the field and made necessary the development of special technique and, to some extent, of a special organisation. This chapter will examine, first, the kinds of gas employed and the methods of their employment; second, the evolution of defensive measures; and, third, the medical problem proper—that of the physical and mental reaction, treatment and disposal of patients.

An outstanding feature of chemical⁹ warfare lies in the protean character of the weapon and of its applications. Apart from industrial and economic considerations, **Nature of the chemical weapon** “chemicals” were selected for this use by reason of physical and toxic attributes; and these, in turn, determined the character of the problems of defence, and of the treatment and disposal of the casualties. The technical problem of defence was a matter of physics and chemistry. The problems of the medical service derived from the toxic effects of the selected chemicals, and the reaction induced by them in the tissues.

A feature of prime medical interest in connection with poison gas is found in the fact that the new type of traumatic agent was as novel in the physiological and clinical sphere as in the military one. The organic and instinctive reactions of the human body, not less than the intelligent and informed

⁸ In the last year of the war over fifty per cent. of German shells contained chemical poisons

⁹ However cogent may be the considerations that have led to the substitution of the term “chemical” for “gas” warfare—and though in some cases the liquid, and in others the solid state of the substance used, is a prime factor in its employment—hitherto chemical warfare has depended on the fact that some poisons can be made to diffuse minutely through the air and that, *in this form*, they can wound or irritate the tissues of the body, in particular of the lungs. Exact aiming is thus unnecessary. Poisons in solution are far less useful weapons: a horse led to water need not drink—but he must breathe. Not but what—failing some cogent change in their outlook—the poisoning of wells and other water-supplies will doubtless occupy the future attention of “totalitarian” strategists.

response by educated and scientifically equipped human communities, were alike directed against agents that are not met with in normal experience—that are lacking both from the physical environment of the body, and from the social experiences of the community.

Substances Employed. In all over thirty chemical substances, gases, liquids and solids were employed in chemical warfare. In the Great War these were projected (1) as gas clouds (from a line of cylinders or from massed batteries of “projectors”); or (2) were propelled in shells and dispersed by explosion. Solids such as diphenyl-chlorarsine were dispersed in high explosive shells as “smokes”, particulate in varying degree, reaching even the ultra-microscopic; on the other hand liquids or liquefied gases, such as yperite, chloropicrin, phosgene, chlorine were dispersed as sprays, vapours, emanations or gases depending on the boiling point and vapour tension, the dispersal being effected either by packing them with the high explosive in the shell or, more commonly, by containing them in shells with a small bursting charge. The success of the chemical weapon rests in no small measure on the fact that the virulent poison dichlor-ethyl-sulphide, at ordinary temperatures an oily liquid with a vapour tension of only 0.09 mm., gives off a highly toxic and penetrating vapour permitting thus a local “persistent” effect, which is enhanced by its peculiar delayed toxic action. At the end of the war this quality of persistence, more even than toxic action, determined gas tactics and the classification and assembling of chemicals for use. Other “persistent” shell fillings used were ethyl-iodoacetate (lachrymator) and to a less extent, chloropicrin. Lewisite, a powerful poison and also persistent, was designed in America but was not available for the Great War.

The interest of the medical service in these chemicals of warfare centred in the pathogenesis and pathology of the lesions induced, which determined the problems of evacuation and treatment. The military leaders on the other hand were concerned with their crude capacity for producing disablement, and with the physical and chemical properties that determined the mode of

Classification of warfare gases

propulsion and dispersion, problems of defence, and so forth. The substances, therefore, can be classified in various ways, depending on the purpose to be served. The most general classification, and medically the most convenient, was by their crude toxic action in the physical condition in which they were most commonly employed as weapons.¹⁰

Toxicological classification. In accordance with their toxic action gases used in war were classified as "acute lung irritants" (otherwise known as "lethal gas", of which the most important were chlorine, phosgene, "di-phosgene", chloropicrin); "lachrymators" (benzyl bromide, xylyl bromide, bromacetone); "sternutators" ("sneezing" gases—chiefly the arsenical "smokes"—arsenes); "vesicants" (necrotic poisons—dichlor-ethyl-sulphide or "mustard");¹¹ "systemic poisons" (hydro-cyanic acid, sulphuretted hydrogen). Carbon monoxide which, because of its powers of penetration, might have been the deadliest, could not be used by reason of its physical properties.

Practically, however, the poison gases fall in three very distinct groups—the superficial irritants, the acute pulmonary "irritants", and yperite. The groups overlap, particularly the first two, but not materially. Chloropicrin, for example, has lachrymant effects and also causes sneezing and vomiting; bromacetone in strong concentration is a lung irritant. Gases with action diverging even slightly from those likely to be expected were exploited for tactical surprise.

"Instructions" issued in January 1918 by the Medical Department of the German War Ministry are clear and to the point. The following is an epitome:

Warfare gases other than Yellow Cross and HCN. The warfare gases hitherto used in this war cause substantially the same general effects (warfare gas poisoning). These consist of (i) Irritant action on the mucous membranes affected (conjunctiva, nose, throat, larynx, air passages). (ii) Special changes in the tissue of the lungs. Some gases have a pronounced irritant action and little effect on the lungs, others have only a slight irritant action and a powerful effect on the lungs,

¹⁰ Thus the French employed a toxicological classification but the Germans one which served direct tactical ends. For practical artillery purposes each nation had special shell markings, denoting its chemical "filling". The Germans assembled the chemicals for tactical use in the well-known "blue" "green" and "yellow" cross shell and their many variants and sub-variants.

¹¹ The word "mustard" is discarded for the French "yperite" because it approves a factual error.

while others again possess irritating and damaging properties to an equal degree. The irritant action may produce results varying in degree from slight hyperaemia and scanty secretion to severe inflammation associated with erosion, destruction of tissues, and the clinical picture of pulmonary oedema.

Poisoning with Yellow Cross Substance (dichlor-ethyl-sulphide). It is the exception for this to cause symptoms immediately after its contact with the body. Redness, burning and itching of the skin, headache, malaise, vomiting, burning of the eyes appear within the first hour in the severest cases but usually they only become evident after 4 to 6 hours or even longer. The obstinacy with which the pathological changes develop is also characteristic. Their tendency is to extend further during a long period rather than to retrogress and to heal up. In mild cases the upper air passages only are attacked. In moderately severe cases the trouble goes deeper, and high concentration or prolonged inhalation of the poisonous vapour cause the severest illness. All effects may result from contact with the liquid itself (as spray or on contact) and as well from exposure to the vapour alone.

The table on page 12 shows the chief physical features of the most important gases employed by the Germans.¹² Their pathogenic qualifications are examined later (Part II). Subjoined is a full list, so far as they are known, of the chemicals employed on both sides.

Acute Lung Irritants. Chlorine, phosgene, chlormethyl-chloroformate, trichlormethyl-chloroformate ("di-phosgene"), chloropicrin, stannic chloride, phenyl-carbylamine-chloride, cyanogen bromide, dichlor-methyl-ether.

Lachrymators. Benzyl bromide, xylyl bromide, ethyl-iodoacetate, bromacetone, monobrom-methyl-ethyl-ketone, dibrom-methyl-ethyl-ketone, acrolein, methyl-chlorsulphonate, brombenzylcyanide, chloracetophenone.

Paralysants ("systemic poisons"). Hydrocyanic acid, sulphuretted hydrogen.

Sensory irritants of eyes, nose and chest (*Sternutators*) diphenyl-chlorarsine, diphenyl-cyanarsine, ethyl-dichlorarsine, ethyl-dibromarsine, N. ethyl carbazol.

Vesicants. Dichlor-ethyl-sulphide. (British "mustard", French "yperite", German "yellow cross stuff").¹³

The following table shows the boiling point, vaporising

¹² HCN and stannic chloride—in shell with phosgene—and ethyl-iodoacetate (L) were used by the Allies alone. Phosgene was first used by them in June 1916, yperite—by the French—in June 1918. Both British and German authorities stress the importance of close liaison between the medical service and the combatant branch in the use of gas. Yperite was first used by the British on a big scale when the Australian Corps attacked the Hindenburg Line, in Sept. 1918.

¹³ This list is compiled from the *British Official Medical History* and Hanslian's *Chemische Krieg*, 2nd Edition 1927 loc. cit. The last two lachrymators were not employed by the Germans. Some other substances—e.g. Lewisite—are excluded as not pertinent to the war experience of 1914-18.

pressure, and military effectiveness of the chief gases used in 1915-18.

Substance.	Chemical formula.	Boiling point Cent.	Vapour Press. at 30 °C.	Disabling concentration. ¹⁴	Lethal concentration.
ACUTE LUNG IRRITANTS.					
Chlorine ..	Cl ₂	- 33·6	6,650	1:10,000	1:10,000
Phosgene ..	CO Cl ₂	+ 8	1,750	1:100,000	1:50,000
"Di-phosgene"	Cl.COO, CCl ₂	+ 128	16·3	1:200,000	1:50,000
Chloropicrin	CCl ₃ .NO ₂	+ 112	30·5	1:200,000	1:50,000 (cumulative)

LACHRYMATORS.

Benzyl bromide	C ₆ H ₅ CH ₂ Br	+ 198	About 1 mm. at 25°	1:2,000,000	—
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SENSORY IRRITANTS OF EYES, NOSE AND CHEST (STERNUTATORS)

Diphenyl-chlorarsine	(C ₆ H ₅) ₂ AsCl.	+ 333 (M.P. + 43°)	0·02 mm. at 50°	1:10,000,000	1:50,000
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VESICANTS

"Yperite" ..	(CH ₂ Cl. CH ₂) ₂ S	+ 217 (M.P. + 13°)	0·09	—	1:1,000,000 with 60 min. ex- posure ¹⁵
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Before the advent of yperite had radically changed the tactical outlook, the developments of gas warfare were based on the diverse toxic effects produced by chemicals. After the first employment of chlorine as a crude asphyxiant and demoraliser, and of lachrymator shell to impair vision, chemicals were selected with a more refined and astute regard for their physical and physiological reactions; and there is ample proof of the effect: the terrifying features of death from chlorine had a profound

¹⁴ Disablement in a few seconds through lachrymation, pain or coughing. Inhalation for more than one or two minutes produces bronchial or pulmonary lesions.

¹⁵ The toxic properties of yperite do not lend themselves to tabulation. The figures are based on human observation rather than on animal experiments.

and persisting moral effect, which later was replaced by the mystery effects of phosgene, and the tension induced by the insidious but inexorable onset of the yperite burn. The qualities of the "gases" were combined with extraordinary ingenuity to produce effects, physical and psychic, which might enhance casualties, or be exploited otherwise to some specific military advantage. Some illustration of the tactical ruses employed will help to indicate the problem confronting those responsible for anti-"gas" defence and for the treatment of casualties.¹⁶

Tactical ruses had two chief objects. First, the attainment of surprise—by employing novel weapons, especially such as should not advertise their presence by smell, irritation etc. The most important of these were phosgene and the arsenes, whose use was foreseen, and yperite and chloropicrin which were unexpected. A variant on this device was the use, alone or in combination of chemicals whose action should be such as to confuse and mislead. Thus chloropicrin was at first mistaken for the harmless lachrymators; non-lethal and lethal irritant shells were thrown in quick succession; and "sternutants" were mixed with lethal gas to conceal the presence of the latter. The second object was to pierce the measures for defence, whether those of the unit—such as the gas alarm—or the drill and discipline of the individual. The element of surprise was, of course, a factor in both. The first device employed by the Germans was to increase enormously the concentration of the gas cloud and to combine phosgene with chlorine. This had an important success, since—as will be seen—the principle of the first British gas mask, in use till 1917,—was technically defective, though not so gravely as to risk disaster. Indeed at no time in the war after the first gas clouds were the Allied defences effectively penetrated. With the substitution of gas shells for the cloud gas an extraordinary variety of technical devices, chemical and physical, and ruses were used to make up for loss of concentration. With the advent of yperite the whole outlook changed; gas warfare became "scientific" and the German gas weapon a serious aspirant for precedence over the Allied H.E.

¹⁶ A clever study of these is made in *Traps for young soldiers and civilians in Chemical (gas) warfare* by Alan Brooksbank. (Angus & Robertson; Sydney. 1937)

From the tactical and also the medical standpoint the German gas offensive is conveniently divided into four periods.

1. *The cloud gas and tear gas shell period*, April 1915 to August 1916. This period comprises the six gas clouds of April-May 1915; the tear shell interlude June-December 1915; and the great clouds of chlorine plus phosgene December 1915 to August 1916.

**The
development of
gas warfare**

Protection during this period was at first nil; then, in succession, cotton waste respirators, goggles, fabric helmets (Hypo, P., P.H., and P.H.G.) and a few large box respirators for special units. In the second series of gas clouds the aim of the Germans "to surprise the troops with a deadly concentration of gas before they had time to adjust their protective helmets", and to penetrate this protection, was in some measure achieved.¹⁷

Cloud gas in the A.I.F. It was one of the last of these attacks that gave the A.I.F. infantry its only experiences of German cloud gas. On the night of 16th-17th June 1916, the Germans at Messines sent over a gas cloud containing, apparently, smoke mixed with a little gas, followed after an interval, by a second cloud which is stated to have been formed by a strong concentration of phosgene with some chlorine. The second cloud was obviously intended to catch men who had laid aside their helmets. The British troops holding the line suffered some 400 casualties. The sector was about to be taken over by the 2nd Australian Division, and an advanced party of 45 officers and men of the 25th Battalion were in the line, but there is no record of any being gassed. The cloud passed over the rear area of 1 Anzac Corps eight miles to the south, and no serious casualties occurred, though the clover and crops were "nipped". A cyclist, hurrying to reach his forgotten gas

¹⁷ The quotation is from *British Official Medical History (Diseases, Vol. II, p. 277)*. Of the attack on 27 and 29 April, 1916, the British Official Historian (*Military Operations 1916, p. 196*) states that "Although it was not admitted at the time . . . the helmet was obviously insufficient protection against the strong concentration of gas which the enemy was able to produce. . . . The manufacture of the box respirators therefore was pushed on with all speed. . . . (The) uneasy and quite justified feeling that the gas helmet was now a doubtful protection was allayed for the time being by the information that the particular helmets in question had not been properly impregnated with chemicals." A like result occurred in the attacks of June 16 and 17. The intensity of the cloud in the front lines may be judged by the fact that really dangerous concentration was experienced 10,000 yards in the rear. The new "box respirator" (large) issued to machine gunners afforded perfect protection. The casualties in these attacks were heavy.

helmet, breathed in a larger dose and suffered more severely than others.

2. *The "lethal shell" period*, July 1916 to July 1917. This period was dominated by the pulmonary irritants, phosgene, di-phosgene and chlorarsine. For protection the troops depended at first on fabric helmets. Small box respirators were introduced at the end of August 1916, the issue being completed early in 1917. The N.C. container (with improved filling and a smoke filter) was introduced in August 1917. The phosgene had previously been masked by its discharge as a cloud with chlorine and its peculiar feature, the induction of insidious and delayed onset of fatal pulmonary oedema, make this stage in some respects the most dramatic of any phase of chemical warfare. More than any it was responsible for determining the psychic atmosphere. Men who had passed seemingly unscathed through the gas dropped dead some time later after slight exertion; or men sent from the A.D.S. as sitting cases were found moribund on arrival at the M.D.S. The psychic effect produced at this period was later enhanced by the new gases and tactics referred to above. Though the casualty rate was slowed down and wastage from gas reduced, the indirect results were disproportionate. These psychic effects (to which reference will be made later), and in particular "D.A.H.", date chiefly from the use of phosgene and chloropicrin and it was at that stage that the advanced centres for treatment were instituted.

In this phase of "gas" the A.I.F. had their share: in particular the field artillery in the Battle of Bullecourt and the infantry in the approach march and assembly for the Battle of Messines when tear gas shells and chloropicrin were used.

3. *Yperite and the arsenes: Third Battle of Ypres*. July to December, 1917. The advent of yperite as a weapon was an event of outstanding military importance. The nature and action of the substance was determined in a few days; the box respirator was effective, and a line of treatment promptly evolved. But the problem set to the defence was new and in some respects insoluble—as it is to-day. The "persistent" pollution of routes of clearance greatly hampered the medical service as did the necessity for special arrangements for decontamination and so

forth. In effect the gas problem became now a twofold one of lethal oedema and persistent vesication: and to cap the two came the now urgent problem of "N.Y.D. Gas". The military picture of yperite is well set out by the Australian Official Historian—the outward and visible signs of morbid states presently to be examined are seen as human experience.

The Germans used this new agent with dreadful success, masking the shoots with high explosive . . . masks would have to be worn during the whole bombardment including sleep. Bivouacs were frequently knocked in, and the ground saturated with mustard oil could not be reoccupied. . . . On the night of October 28th, the 5th and 6th Batteries on Anzac Ridge were put out of action by gas. . . . On November 2nd two more battery commanders were gassed and died within 48 hours. In a short tour of the support line the 25th Battalion had 6 officers and 202 others gassed. One company had to change its bivouac three times. . . . Few immediate deaths were caused: of the 1,313 cases in the artillery in October only 20 were quickly fatal. But the condition of the worst cases was pitiful, eyes swollen and streaming, voices gone, and bodies blistered. Whole Battalions came out hoarse from the effects.

The arsenical smokes. At the same time with yperite the Germans introduced their "blue cross" shell containing the sternutant smokes. In its way this was an event even more dramatic than the advent of yperite. The Germans expected almost decisive effects from these smokes owing to the bizarre train of symptoms caused, the terrific pain and demoralising misery, together with their high power of penetration. They therefore exploited this type of shell far beyond its worth. The ill-effects were too transient and the British filter too efficient. For a short time the high light of the gas picture, as a weapon they were largely ineffective.

4. *Consummation of chemical warfare: 1918.* This phase presents two periods: the German *offensive*—in effect from Cambrai, 20th November 1917, till May 1918; and *defensive*, June till November. In the preparations for the great attack in March the Germans threw an immense amount of "gas": blue and yellow cross shell was supplemented by phosgene clouds from projectors. The report of Captain E. I. Littlejohn, the Medical Specialist to No. 3 A.C.C.S., illustrates aptly the changing picture in the kaleidoscope of gas warfare.

March. 512 cases came into the C.C.S. Many of these had been subjected to more than one gas, but, classing the men under Irritant,

Vesicant, Sternutator and Lachrymator according to the more definite signs and symptoms, the figures show:

Sternutator	.. .. .	149	Deaths	Nil
Vesicant	.. .. .	245	"	5
Irritant	.. .. .	23	"	10
Unclassified	.. .. .	95	"	3

The new Sternutator Gas used by the Germans—Diphenyl-chlorarsine—accounted for 150 of the admissions. . . .

April. Gas. All admissions were due to poisoning by shell gas with one exception, the only case of Phosgene poisoning seen during the month. All gas cases were slight.

Vesicant 102; Sternutator 25; Irritant 1. No deaths.

Of the mustard gas type, no cases were admitted with chest signs. All were evacuated to the base within four days of being gassed. By the time cases classified as suffering from sternutator gas were admitted to the C.C.S. they showed very few signs of disability.

The transition from offensive to defensive on the front of the "Michael" offensive near Amiens began in April 1918 and was marked by a wholly unprecedented deluge of yperite—the gas which denies the position shelled to each side alike. Of the terrific gas-shell bombardment on April 16th-17th that preceded the German assault on Villers-Bretonneux, the Australian Official Historian records that "officers and men had received a staggering object lesson in the need for precautions"; and this statement is fully supported by the figures. The experiences of the Australian force with gas at this time, and the task imposed thereby on the medical service, have been described in *Volume II* as part of the general scheme and action of evacuation from these battles, but some further technical details will be found later in this chapter. The use of this gas was most effective where the opposing troops were sheltered in woods, villages or even gullies in a confined area, from which they could not withdraw without grave tactical disadvantage. The position at Villers-Bretonneux was precisely of that kind, and was heavily gassed again on May 27th and other dates, as were the valley and woods at Herleville in which the front line had to shelter for several days during the advance to victory in August. Much yperite was also used by the Germans during the breaking of the Hindenburg Line by the Australians and Americans, September 27th-October 6th. It was the irony of fate that the use of gas by the German leaders could not reach its greatest effectiveness until they were on the defensive prior to their catastrophic defeat.

II

THE DEVELOPMENT OF DEFENCE AGAINST WARFARE GASES

Offence. Efforts were soon on foot to mobilise British chemists for offensive purposes. So remote from the old Army standards and training were the conceptions of the new scientific warfare that there was no scientific cadre or outstanding scientific soldier to take over the direction and organisation of these matters at the front or at home.¹⁸

**Evolution of
British gas
warfare**

Defence. A decision had soon been reached to retaliate on the Germans with gas, and it was at first suggested that the same troops that were to conduct offensive operations might also be made responsible for defensive measures. . . . Attention was drawn to the fact that defence must for some time be more important than offence. . . . If, therefore, the proposed scheme was adopted there was a grave risk of delay in the organization of defence, since several months would be required for the training of special units for offensive gas warfare and for the provision of supplies of warfare gas.¹⁹

The history of British gas warfare is that of a prolonged and painful struggle against grave handicaps. These in part were inherent in the circumstances, some common to the Allies, some particular to Britain herself. The Germans had the temporary advantage of freedom from a sense of "moral" obligation; they had also a vast chemical industry, and a scientifically organised, self-contained social-military structure. The British suffered from the Army's traditional undervaluation of scientific men and methods, and also from false starts and home-made muddle. The notable successes achieved were wrenched from inefficient or unsuitable methods, and from many failures, some partial, others complete.

Organisation. The chief causes of inefficiency on this count were the failure to co-ordinate the activities of the several departments of gas warfare, especially those of *offence* with those of *defence*. There was separatism in research, administration, training and discipline. On the offensive side there was a gap between research and manufacture and supply. The economic individualism characteristic of British industry, and the social and intellectual self-complacency of the British Army, fostered these separations and increased them. The result was serious overlapping and confusion, never fully resolved,

¹⁸ Victor Lefebure, *The Riddle of the Rhine*, p. 92.

¹⁹ *British Official Medical History*, loc. cit., p. 328.

from which, however, in typical British fashion individual genius and "devotion to duty" compelled no small measure of success. It is noteworthy that at home it was "offence" but in the field "defence", that was chiefly handicapped through defects in organisation.

War Office organisation of gas defence. "On the commencement of gas warfare the organisation of defence against gas fell within the province of the Adjutant-General's Branch of the staff, and the onus of providing protective appliances and of formulating instructions for their use had to be borne by the medical services."²⁰

Sir Alfred Keogh, the D.G.M.S., placed the duty on the sub-department of Preventive Medicine. Executive responsibility was placed on a small "Anti-gas Committee" under the direction of the eminent sanitary expert, Sir William Horrocks. A laboratory was equipped and staffed for research at the R.A.M.C. College, Millbank, where, under the direction of Major P. S. Lelean, R.A.M.C.²¹ the respirators used by the British Army were designed, constructed and tested. Their manufacture was directed by the Ministry of Munitions; but the British Medical History states, without doubt justly that "the success with which the Anti-gas Department was able to meet the demands made upon it for protective devices must largely be attributed to the fact that research, design, manufacture and inspection were all finally controlled by one department". Liaison was also maintained with Gas Defence Department of Haig's staff in the B.E.F., and with the physiological and pathological research carried out at the R.A.M.C. experimental grounds and by the Medical Research Committee. From the R.A.M.C. laboratory came the designs for nine types and sub-types of respirator, with which at various times the British troops were equipped, and the initiative that supplied during the war 55 million of these, 19 million being "box respirators". In October 1917, chiefly in the interests of the "offensive" side, the medical service handed over control and the previously separate organisations were united to form a single department. By the end of the war, says the British

²⁰ *British Official Medical History, Diseases, Vol. II, p. 324.*

²¹ *See Vol. I, pp. 603, 607.*

Medical History, this had reached a "final more or less efficient and symmetrical form as the 'Chemical Warfare Department' of the Ministry of Munitions".

The Field Command, B.E.F. Under the General Staff the offensive possibilities of gas warfare were energetically exploited. R.E. Companies were formed and establishment authorised. Defence, on the other hand, was made the responsibility of an A.D.M.S. on the staff of the Director-General, reporting to the Adjutant-General. The scheme of "anti-gas organisation" provided for the establishment of a central laboratory at G.H.Q., and for the appointment of special officers to each army to act as "Chemical Advisers", their allegiance being shared by the D.M.S. and the D.A. & Q.M.G.

Early in 1916 the General Staff took over gas defence. On March 9 a Directorate of Gas Services was established, with two branches, "offensive" and "defensive". The latter, however, remained under a medical officer until July 1917, when it was taken over by an officer of the R.E. Liaison between the medical and gas services was provided for by the attachment of a medical officer, (Major C. G. Douglas) as "physiological adviser". "From this time," says the British History, "the responsibility of the medical service was confined to the handling and treating of gas casualties and defence became a purely military problem."²²

A German authority says:

The perfection of protective measures and improvement of "gas discipline" ultimately reduced the mortality among the Allies to such an extent that a German bombardment by gas artillery produced a mortality in the case of blue plus green cross of only 6 per cent., and in the

²² *French Army* The course of events is described as follows by Mignon (*Le Service de Santé*, p. 764). "Chose curieuse, ce fut le service de santé qui fut chargé par le commandement de s'occuper de la recherche, de l'approvisionnement, de la distribution et du mode d'emploi de défense contre les gaz sous le prétexte que la prophylaxie relevait de la chimie. . . Il va sans dire que le service de santé n'a pas continué à garder le monopole de la défense des troupes. Le commandement l'a prise tardivement à son compte, et les médecins ont cessé d'avoir une responsabilité dans la prophylaxie des gaz."

U.S.A. The same "curious" reaction to the sudden crisis is found in the Army of the U.S.A. where "the earliest activities of the Medical Department with respect to gas warfare were concerned with furnishing gas masks and other prophylactic apparatus for the Army rather than the preparation for the care and treatment of gas casualties." The supply of respirators remained with the department till the end of the war, but in the field all gas defence was relegated to combatant services as being "distinctly combatant" while "medical officers were classed as non-combatants". (*History of the Medical Department, U.S.A. Army, Vol. XIV*, p. 32.)

case of yellow cross of only 2·5 per cent. These figures . . . are a proof that gas as a means of attack was a humane weapon in the World War; but they show also that **The development of gas defence** *the claim to the term "humane" is solely based upon the fact that it is inherent in this scientific mode of fighting that the damage it might produce can be prevented by the right use of effective protective measures*²³

We owe to Mr. Winston Churchill the pregnant epigram that Lord Jellicoe was the one man on either side who could have lost the war in an afternoon. There is weighty authority for a belief that the one way to-day in which a national army may be demoralised irretrievably and with a like rapidity, is by the wholesale penetration of its gas defence. A study of the evolution of the modern gas mask and the development of national types is a potent incentive to the "eternal vigilance which is the price of safety".

The development of the Allied gas defensive vis-a-vis the German gas offensive has been extolled as one of the major military triumphs of the war. And the claim may be fully justified by the facts that both Britain and France devised and supplied to their Armies respirators that, in their final form, afforded complete protection against any poison gas devised by the enemy; that they were able to implement this technical achievement by a system of education, drill, and discipline that eventually made the protective actions almost automatic—and all this with a minute margin of failure. In spite of military treachery and a commanding start "poison gas" did not win the war for the Central Powers. But it is important to note that this successful defence was achieved in the face of errors that sometimes reduced the margin of safety to very narrow limits—for example, in 1915 before gas discipline was established, and in 1916 when the fabric helmet was failing against high concentrations and chloropicrin.

The problems in gas defence. These were twofold (1) to create means and methods of protection against the gas weapon and provide the troops with the technical apparatus required; (2) to train them in its use and to organise defence, individual and collective, on a sound military footing. During the creative

²³ *Der Chemische Krieg*, von Dr. Rudolph Hanslian, p. 149. The italics are not in the original.

period of gas defence the medical service was largely responsible for initiative and executive in both of these duties.

Protective measures may be classed as collective and individual. The possibilities of mass defence, *e.g.* by discharge of neutralising gases or sprays, or by dispersing the cloud by lighting fires and so forth—were at once investigated by both sides, but no practical method was discovered. Measures for “collective protection” on a smaller scale, *e.g.* by the “gas proofing” of huts and dugouts, were of major importance, especially to the medical service. The general principle in all these was the same—exclusion of contaminated air, and provision for entry and egress by a double door of curtains kept moist with suitable chemical solution such as hypo-soda, the double curtains forming an air lock. Methods of local dispersal of “gas” developed from trench-flappers (designed by an English lady) and “vermoral” sprayers charged with hypo. With the advent of yperite the problem of “decontamination”, individual as well as general, became an urgent one. Neutralisation by chlorine, for example, by chloride of lime, was introduced in the B.E.F. only in 1918. The matter of individual decontamination was taken up seriously only in the medical service, where it became a vital element in treatment of yperite casualties.

The developments of collective protection by forecasts of wind and weather, gas alerts and alarms, gas-posts and sentries, tests for gas, instruction and education, are matters of purely military concern.

Individual defence. At the outbreak of the war not one of the belligerent nations was equipped with any kind of apparatus for protection against gas. Everything therefore that was invented introduced and improved upon in this sphere originated during the war under the pressing need of the chemical weapon.²⁴

The problem of the inventors of the gas mask was to provide a selective filter that would retain harmful gases but let through oxygen and nitrogen as “air”. The problem is obviously a tricky one since oxygen is itself chemically a very

²⁴ Rudolf Hanslian, *Der Chemische Krieg*, p. 149. On the evidence available there appears no reason to doubt the general correctness of this statement. Germany issued the canister type of respirator to her troops in 1915.

active gas.²⁵ The British troops were supplied officially during the war with three types of protective apparatus. (1) The first, an improvised medicated cotton waste pad or "respirator" has already been described. (2) The idea of the second, the fabric cowl or "gas helmet", came from a sergeant of the Newfoundland Medical Corps who had observed Germans wearing a hood. No such mask was ever official in the German Army, but the device of covering up the head with a cloth and tucking this tightly into the coat collar was obvious as was its impregnation with a chemical and the addition of eye-pieces. A sample made in France was taken to England in May 1915 and embodied the principle by which British and French troops were protected for over a year. The fabric of the "helmet" which held the neutralising solution was made first of flannel, later of a special cotton material. Mica eye-pieces which cracked, were replaced successively by cellophane and by rubber sponge and glass goggles (Type "G") for protection against the lachrymators. Later an expiratory valve was added, forming the "tube helmet". To deal with phosgene (the use of which was predicted in May by Sir Ernest Rutherford) Phenol and later Hexamine were added to the solution (the latter a suggestion from Moscow). In whatever form—"smoke helmet", "tube helmet", "P", "P.H.", and "P.H.G." helmet—this mask remained the same in principle; it allowed inspiration through the interstices of a fabric which contained a neutralising chemical in solution together with glycerine to prevent drying.²⁶

As a resort in a desperate emergency this simple device probably saved the Allies but it was wholly inadequate to permanent defence.

²⁵ Before the war the apparatus in use against "mine gas", in particular CO embodied another principle by which air is excluded, and oxygen is obtained from a store contained in steel cylinders, either carried in portable apparatus such as that designed by Professor J. S. Haldane, or led through lengths of tubing. The latter apparatus had an outlet valve for CO₂ and water. Such apparatus was much used in the war in mining operations, but was obviously impracticable for ordinary soldiering. The subject of mine gas in war, however, is one of major importance. The three Australian "tunnelling companies" played a notable part in the vast British mining operations—as at Hill 60, Messines Ridge, Neuport and Hill 70, near Loos, and officers of the A. A. M. C. were attached as R. M. O's to these. Their duties did not, however, involve direct concern in mine gas problems, nor did these differ essentially from those of civil life. By a curious coincidence the chief component of mine gas, CO, the one poisonous gas that entirely resisted filtration, could not be used as a weapon.

²⁶ The first French mask (M. 2) also consisted of layers of fabric impregnated with chemicals, used as a face mask,

(3) *Evolution of the canister filter type.* Early, in June, 1915, mails from Europe brought to Australia details of the German gas attacks. On the 9th the heads of the faculties of Chemistry, Physics, and Physiology in the University of Melbourne²⁷ called on the Minister for Defence to offer their services and the resources of their departments for any purpose that might serve the British cause. In particular they suggested protection against poison gas since it was obvious to them that no "respirator" in use or suggested²⁸ had any scientific basis. With the concurrence of the Minister they at once began experiments in gas defence. A report by them on 21st June 1915 on "Asphyxiating Gases and Preventive Measures" gave specifications for an apparatus of the canister type

which has been tested by us with satisfactory results both in the laboratory and in a special trench charged with asphyxiating gas.

Though it did not influence the evolution of British gas defence, the development of this apparatus is of sufficient interest to justify its description later in this chapter. What is important here is the statement in this early report of these Melbourne scientists of the "necessary guiding principles" which illustrate the lines of thought that should initiate such an experiment, and which moreover, though arrived at quite independently, are precisely those that governed the design of the British canister type of "respirator" which differed materially from that adopted by other nations.

(1) The advent of a powerful new weapon in warfare, such as chlorine or other asphyxiating gas, imperatively demands a definite addition for defensive purposes to the regulation equipment of our soldiers.

(2) While such new equipment should be made as simple, light and inexpensive as possible, it is of the first importance that it should be thoroughly efficient.

(3) The construction and use of the apparatus should be easily explained to the soldier, and it should not readily go wrong. As far as is consistent with efficiency, it should be "foolproof".

(4) The eyes must be efficiently protected, as they are very sensitive to chlorine, etc.

²⁷ Orme Masson, D Sc., F R S, Professor of Chemistry (Later Sir Orme Masson); W. A. Osborne, M.B., B Ch, D Sc, Professor of Physiology, T. H. Laby, D Sc, Professor of Natural Philosophy. The Headquarters of the Commonwealth Department of Defence were situated in Melbourne.

²⁸ Their report said. "Ordinary respirators, such as may easily be made by amateur workers, are useless or nearly useless. We have no hesitation in stating this, in spite of the fact that British Army authorities appear to have called for volunteer help in the provision of such respirators."

(5) The nose must be closed independently so as to ensure that all respiration is by the mouth

(6) All the inhaled air must enter through a non-leaking mouth-piece after passing through an efficient chemical filter, which completely absorbs all noxious gas.

(7) The exhaled air must pass out by a separate tube direct to the atmosphere.

(8) The dimensions of the filter and air-tubes must be such as to admit of the inhalation, without serious difficulty, of ten litres of air per minute. This is the amount required by a man doing moderate exercise. He could do with somewhat less if sitting still, and would require more if running or taking other violent exercise.

(9) The amount of chemical purifier in the filter should be sufficient to absorb completely not less than 6 litres of chlorine i.e., to last for one hour in an atmosphere containing on the average 1 per cent. of chlorine or 12 minutes in an atmosphere containing 5 per cent. At present it seems probable that this would afford ample protection during any single attack, but actual experience in the field might suggest some alteration of the figures given.

(10) The purifier employed must be capable of absorbing and destroying not only chlorine and bromine but also hydrogen chloride, sulphur dioxide and as many as possible of the other noxious gases and vapours that are by their nature suitable for offensive purposes.

(11) The filter must be easily emptied and recharged with fresh purifier after use.

(12) When not in use, the filter must be easily closed to protect the purifier from slow deterioration by atmospheric carbonic acid and moisture.²⁹

Forms of gas mask. The only type to survive trial by battle was that in which the inhaled air is drawn through a filtering canister. Two forms of this came into use in the war, reflecting the character, technical aptitudes and facilities of the nations using them. These were the British "box respirator"³⁰ and the German "snout" form. In the first, on the "safety first" principle, a canister of large capacity, connecting by rubber tube with a flanged mouth-piece, was slung from the shoulders and carried on the chest. In the snout type (adopted also, in an improved form, by the French for general use) the much smaller canister screwed directly into a plate on an air-tight face-mask, air being respired directly through the canister. The greater size of the British canister allowed for a large charge

²⁹ The chemical absorbent used and recommended was coarsely granulated soda lime "which is very efficient and serves well for almost all the gases that are at all likely to be employed" It was fully as effective against phosgene.

³⁰ The principle embodied in this was also used in the French Tissot pattern respirator and the German A. m. E.-Gerat, which were used for special troops requiring greater protection or visibility (*see* Hanshan, p. 163).

of absorbent without increasing unduly its "vital capacity" for respiration. The snout type on the other hand, though much more convenient for use, required a small and therefore highly potent charge since it depended from a face-mask in which a close fit was relied on to exclude the external air and not (as in the British mask) the use of nose-clip and mouth-piece. The British make scored also through the greater surface capacity available for the filtration of the "blue cross" smokes.

The two forms of mask developed along these lines. From the beginning the Germans relied chiefly on the "general" adsorptive properties of brick and pumice and especially of *wood charcoal* of which a quality was developed much superior to that in use by Britain; the Germans relied less on the specific action of chemicals which, on the other hand, formed the chief charge in the British canister till the neutral reaction and small size of the chloropicrin molecule compelled resource to "adsorption" by high-quality charcoal. Each nation developed new fillings to meet or to forestall the new weapons. Ultimately the Germans relied entirely on their "A" charcoal for protection against gases.³¹

The researches that led to the evolution of the British "box respirator" began in May 1915 with an inquiry into the mechanical requirements of a canister ("tower") type of respirator. In the summer of 1915 experiments on the chemical side were made with granules of soda lime permanganate. As with the Melbourne investigators, the importance of exploiting "adsorption" appears at first to have been overlooked and only a small charge of animal charcoal was used to supplement chemical action. An unwieldy apparatus, the "large box respirator", was issued to special troops in February 1916. Its success against strong gas clouds led up to the "small box respirator" (S.B.R.) which was put in hand in June 1916, the issue being

³¹ The German mask was issued about September 1915. It was developed with the close co-operation of the chemical industry and, though it went through some vicissitudes of function it did not alter in form and has been retained as the German Army type. The soldier carried a spare charge. The French developed two forms: the well known "Tissot", in which the canister was carried on the back and connected with a valveless face-mask in which the inspired air passed over the eye-pieces thus preventing dimming; and a snout form ("A.R.S.") with the same device to prevent dimming. These have been widely adopted for military and civil use. The American Army at first used the "small box respirator", but changed to the Tissot pattern in October 1918. The small box respirator without nose-clip but with outlet valve is retained in the British Army with the Tissot anti-dimming device. The British civilian apparatus is in the snout form.

completed by February 1917. The comparative slowness of this development seems to have been due to a too optimistic estimate by the Ministry of Munitions of the value of the fabric helmet.

The Melbourne University gas mask. A sample of this was sent to the British Munitions Department through the High Commissioner in September 1915 and was reported on by the "Assistant Professor of Hygiene" Royal Army Medical College. He said that it had been "most thoroughly worked out" and the essential features were approved including nose-clip and mouth-piece, expiratory valve and a chemical filling. Some defects were noted—in particular that the soda lime granules would not protect against every gas (especially the lachrymator group and CS_2); no provision was made for talking; and the resistance to breathing was such that a man wearing the apparatus was unable to fulfil the standard test of running a quarter of a mile in $2\frac{1}{2}$ minutes. The form of the nose-clip, mouth-piece and expiratory valve were not ideal. "The apparatus now nearing the final stages of evolution in the R.A.M. College meets most of the difficulties and promises very shortly, and after a few modifications now nearing completion, to meet them all."

Meantime, however, as the British authorities still retained the fabric type the Minister for Defence authorised the manufacture in Australia of 10,000 of these. Eight thousand were ready by the beginning of 1916. The British War Office, however, advised against their issue to the Australian troops, the chief reason being the importance of maintaining uniformity in equipment and maintenance.³² The decision was, without doubt, a wise one. Though promptly produced, and far more effective than the "smoke helmet", the mask was immature³³ and the inventors were too far away to be able to keep in close touch with developments in gas warfare.

³² The masks were sent to England and their material utilised and paid for.

³³ Maj J. H. Anderson, gas officer of the 2nd Aust Divn notes in his diary of 28 June 1916. "Went to see the O.C., Mining Corps, in Hazebrouck. I got one of the Melbourne University Respirators (from Professor David). They have some very good points, but are not too good practically. Still it is wonderfully good when you consider on what data" (they were made). After the war the question was raised whether the ideas embodied in the Melbourne mask had been used in designing the S.B.R. Enquiry by the War Office led to the conclusion that the coincidence of design was purely accidental. Most of the individual features of both masks were on the lines of existing technical inventions, the impervious face-mask of the S.B.R. was borrowed from the German mask.

Collective measures. The first gas clouds had shown, clearly enough, that defence against gas was a matter as much of organisation, instruction and discipline as of apparatus. The medical service was charged in a vague way with these duties, as well as with that of the creation of a technique and tactics for gas defence. On the other hand the General Staff held that an absolutely essential support to the morale of the British soldier when he was faced with the German gas cloud, would be the knowledge that, as soon as possible gas would be used against the Germans too. Such indeed was the staff's concentration upon "offence" that it was over a year before defence was fully accepted as a matter of military concern, and made effective by military discipline rather than by medical exhortation.

"Army" organisation. The appointment in July 1915 of a "Chemical Adviser" to each Army had been followed by the formation of Army "Gas Schools"; and, on the suggestion of the Adjutant-General, a few Divisions started their own schemes for instruction in gas defence. But no establishment of personnel was allotted. The arrangement was purely voluntary; Divisions and units did much as they liked. The more effective German gas attacks in the autumn of 1915 forced a new outlook. It was realised that responsibility for gas defence should never have been thrust on the medical service.

The Australian Army Medical Service and gas defence. The Australian force arrived in France at a cardinal stage in this development and was at once involved in the dual problem of military responsibility and technical efficiency in this matter.

Responsibility: The "Divisional Gas Officer". The force was almost wholly uninformed in the technique of gas defence, save through the excellent instructions and notes on "How to use the gas helmet" issued from General Headquarters. Selected officers and N.C.O's from units were sent to the Army Gas School and in April the D.D.M.S. 1 Anzac, Colonel Manifold, suggested to the D.A. & Q.M.G., Brigadier-General Carruthers, that search be made for "teachers of chemistry or chemical advisers to Firms or Mfg. Coys." who might teach in "Divisional Gas Schools". On April 29th, however, authority was

given by Corps Headquarters for an establishment of an officer and two N.C.O's in each Division, their duties "to include such things as (1) conducting courses in Divisional Gas Schools, (2) giving lectures and demonstrations in gas and flammenwerfer, (3) inspection and instruction in anti-gas apparatus and (4) collection of evidence regarding new forms of gas. In spite of the strong opposition by Colonel Manifold and the A.D's.M.S., who were "strongly of opinion that it is improper to make the Divisional Gas Officer a medical officer both because it takes one away from his proper employment and also that defensive gas training is one of the most important of the military tactical defence measures",³⁴ the Australian Divisions persisted in their nomination of medical officers, and these were appointed.³⁵

Efficiency: The "Brigade Gas Officer". The medical officers appointed were men of outstanding ability and energy and acquitted themselves with credit, indeed with distinction. It is unnecessary to enter into the course of their struggle—"not without dust and heat"—to enforce a standard of efficiency commensurate with the menace as they conceived it. The solution, with which the Australians were pioneers, lay in the appointment of "Brigade Gas Officers"—recommended in January by the D.M.S. Second Army (Surg.-Gen. Porter). "One man for a Division, 26,000 troops, is absurd," says Colonel Manifold. The request was met by seconding medical officers from the field ambulances. In June the importunity of the D.D.M.S. prevailed: applications were called for combatants, and in July all medical officers were relieved. So much impressed was Major A. E. Colvin that he sent a minute to his A.D.M.S. urging "the retention of at least three Brigade Gas Officers as at present. Their presence at Brigade Headquarters and in the lines will always be a constant reminder of the possibilities of gas." He desired to place on record, in view of his experience that

no combatant officer can be as fully impressed with the necessity for

³⁴ Quoted from Colonel Manifold's diary

³⁵ Of the 15 Divisions in Second Army 10 appointed combatants with the technical qualifications, and 5 medical officers. The 1st Aust. Divn. appointed Capt. A. E. Colvin (1st Field Ambulance) and the 2nd Maj. J. H. Anderson (7th Field Ambulance). The 4th and 5th Aust. Divns. which arrived in France appointed Maj. R. S. McGregor (4th Field Ambulance) and Lieut. H. W. Wilson

intensive and constant training in defensive gas measures as a medical Divisional Gas Officer, who, following the casualties from trench to hospital and post mortem room, learns that the only cure for badly gassed cases is prevention, and so by preventing he is curing and thus doing medical work.

Consummation of gas defence. Within a few days of that memorandum being written the problem of combatant keenness was resolved by the new German lethal gas shells, which brought post-haste to all units an instruction, No. "S.S.419B", from G.H.Q., to expedite action; and caused to the A.I.F. "60 casualties in a day, the first rush that we have had".³⁶

In November 1917, the Army Corps having become the unit for administration and action, Divisional Gas Schools were replaced by Corps Gas Schools, which took over the task of training officers and N.C.O's in the multifarious duties that by now formed the routine of gas defence.

III

THE SPECIAL MEDICAL PROBLEMS OF CHEMICAL WARFARE

The clinical complex of "gassing" passed through its evolution in the course of the human experiment of the Great War, and, in animal experiments, continued for a few years after it. It has now attained to the dignity and dimensions of a special and important branch of military medicine, and incidentally, of toxicology.

Toxicology and pathogenesis of warfare chemicals

Historical. Though toxicology has always had an important place in clinical medicine, before the Great War the pathogenesis of poisons had not been studied experimentally by exact physiological methods. The status even of pharmacology was that of an empiric art rather than a science. And if we except carbon monoxide and chloroform, which have not been used in warfare, toxicology was concerned chiefly with poisons in solution or with chronic industrial poisoning. The most exact researches into the action of gaseous irritant poisons were those made in the 'eighties in Germany into the effects of chlorine. The toxic properties of the arsenes were studied in the 'eighties by La Coste and Michaelis. In the South African

³⁶ Quoted from Col. Manifold's diary.

mines the effect of nitrous fumes were investigated in the 'nineties. These had disclosed the essential lesion of pulmonary irritant gases as oedema of the lungs. As the result of the vast experiment in human toxicology in the Great War and of a great campaign of animal experiment, mankind is now happily possessed of a knowledge of the pathogenesis and pathology of some fifty or more air-conveyed poisons, the greater number of which had been hitherto unthought of. The knowledge of them is in some respects more exact and intimate than that of the noxia of peace.

As in the domain of disease caused by micro-organisms and in that of gross wounding, so in the region lying between them—that of trauma by “toxic” substances other than “toxins”—the working of the *vis medicatrix naturae* is recognised in the fundamental reaction of living tissue against the primitive protoplasmic poison, the *hydrogen ion*, by the mobilisation of the “buffer” reserve. The reflex mechanisms of the respiratory tract—laryngeal and bronchiolar and those of the gastro-intestinal (vomiting and peristalsis), have evolved for the purpose of rejecting or ejecting “irritants” from the lungs and intestinal passage. It cannot be doubted that the phenomena characteristic of the acid intoxication by phosgene and chloropicrin, or the “vesicant” effects of yperite, as well as the obvious reflexes induced by chlorine, xylol bromide, and the arsenes, have at least an element of *reaction* as well as of *injury*: and the suggestion may be hazarded that it is along these lines that progress will be made in the future.

Pathogenic classification. The symptoms known as “gas effects” are only the outward sign of complex occult toxic actions and physiological and psychic reactions. On this is based the tactical groupings of warfare gases into the systemic “paralysants”, the “sternutators”, “lachrymators”, “pulmonary irritants”, and “vesicants”. A broader purpose discriminates chemical poisons into (1) those which act as universal protoplasmic poisons, causing damage to or necrosis of the protoplasm of all cells and tissues with which they make effective contact, and (2) those which are selective, and in general produce their results by their influence on some specific function, of sensation or motivation and not on structure or general

vitality. The action of the first is in general superficial; that of the second is systemic. Illustrations from civil life will come readily to mind—examples of the first kind are inorganic acids and alkalis, phosphorus, arsenic; of the second, carbon monoxide, strychnine, tetanus toxin, curari. Warfare chemicals, excepting HCN were essentially of the first type, their action being that of protoplasmic “irritants” or necrosants. Little use was found in the Great War for the systemic poisons, which act chiefly in solution. Large quantities of hydrocyanic (prussic) acid, which in gaseous form is readily absorbed through the lungs, were thrown by the French with little result. The potentialities of this type of poison are, however, obvious.

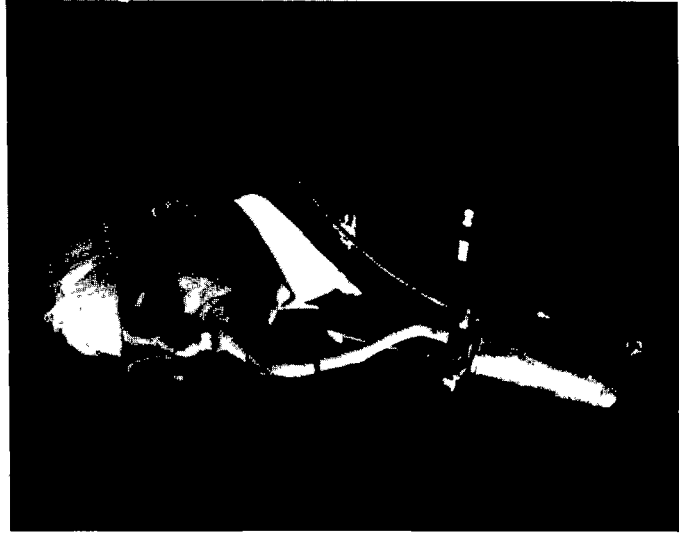
Essential toxicology. The varied pathogenic effect of the warfare chemicals was in the last resort due to the chemical or bio-chemical “toxic” action by their molecules on the cell-substance (cytoplasm).³⁷ Investigation of this aspect of the pathology of chemical poisons was carried out during and after the war.

1. The “*paralysants*” (selective systemic poisons). HCN acts by paralysing the metabolic action of the cytoplasm of the cells of the nervous system.³⁸ The anoxaemic effects of CO and of AsH₃ could not be made use of. This type of poison does not call for further notice.

2. The “*irritant*” gases. The word “irritant” (like “inflammation”) was used to cover a multitude of unrelated sins. With disconcerting impartiality it was applied to the lachrymants, the sternutants, and the lethal lung irritants. The cause of this confusion lies in the fact that there are two elements in their toxicity—a sensory action, and an acute lethal one—each with its own characteristic “reaction”. The sensory irritant effect on the nerve endings is due to immediate toxic stimulation of the nerve endings by contact with the “gas” molecule;

³⁷ Apart from a general dissolution of its constituent molecules, the cell is open to attack in one or more of its vital activities, namely oxygenation, sugar metabolism, acid alkali balance and so forth.

³⁸ To determine the validity of animal experiment as a guide to the toxicity of warfare gases, a “crucial” experiment was undertaken by Professor J. Barcroft of Cambridge. With a dog as control he remained in an atmosphere containing up to 1/1700 of HCN for a minute and 35 seconds. The dog died: he himself experienced only muscular weakness and giddiness. It has been generally accepted that the “experimental” investigation of gassing is not *per se* more “scientific” than human experiment in the field.



1. GAS MASK INVENTED BY MEMBERS OF THE
SCIENCE STAFF OF MELBOURNE UNIVERSITY

Aust War Memorial Collection No J6881.



2. THE BRITISH SMALL BOX RESPIRATOR (SBR)

Recruits receiving instruction in its use from a member
of the WRNS.

Aust. War Memorial Official Photo No A3373



3. AUSTRALIAN SOLDIERS Gassed with "MUSTARD" LYING ABOUT NEAR BOIS L'ABBÉ, VILLERS-BRETTONNEUX, MAY 1918
An example of what should *not* be done

Aust War Memorial Official Photo No E4851

To face p 33.

the lethal effect is due to the disintegration of the cells. The relative prominence of these two effects, together with some selective sensory action, determines the nature of the pathological and clinical picture.

(a) *The lethal (inflammatory) lung irritants.* The sensory irritation provoked by these varies enormously and, in this group, alone determines the *locus* of the lethal lesion and character of its clinical efflorescence. That of the chlorine molecule is intense and characteristic; that of phosgene, except in great concentration, almost entirely lacking: men have died from pulmonary oedema without knowing that they had been "gassed". Thus while every sensory reflex and instinctive or reasoned impulse is mobilised against chlorine, and somewhat less effectively against chloropicrin, phosgene traverses almost unresented the tidal and residual air to reach the alveoli themselves, and there by decomposition develops its lethal action.

Lethal action. The striking phrase from the French "le chlore, avide d'hydrogene", reveals the essential pathogenesis and pathology of these agents. The toxic effects of chlorine, phosgene, di-phosgene and probably to a great extent also of chloropicrin, are essentially a *hydrogen ion* action on the protoplasm of the more superficial tissue cells. In the presence of water chlorine, directly, the others more slowly by decomposition, form HCl (a protoplasmic poison) with the substance or surroundings of the cell ($\text{COCl}_2 + \text{H}_2\text{O} = 2 \text{HCl} + \text{CO}_2$). A characteristic "spoiling" of mucous membrane and underlying capillaries and lymphatics ensues, with consequent effusion of plasma, mechanical and perhaps reactive—a mobilisation of buffer substances. Little or none is absorbed—if any, it is promptly neutralised.³⁹

We shall pick up later the complex morbid syndrome which develops from this essential lesion.

(b) *Sensory "irritants": the lachrymators.* Except in much higher concentrations than are commonly met with in the field, the action of most of the "tear gases" was entirely sensory—due to a selective sensory irritation of nerve endings by the gas in solution. The lethal effects produced by high concen-

³⁹ Chloropicrin has a more complex action which is reflected in the clinical syndrome

trations of lachrymators are those of the lung "irritants", and like these are probably due to decomposition products.

(c) *Sensory "irritants": the arsenes.* The action of these substances is *sui generis*, and beyond the scope of this work. Much is still obscure. From the point of view of warfare and of pathogenesis the essential fact is that in the concentrations actually met with, lethal effects were entirely absent,⁴⁰ the effect being purely "functional". But in saying this we are not relieved of the need for pathogenic discrimination since these "functional" effects produced by the arsenes were nicely balanced between the two aspects of "function"—physiological and psychical. It is possible here only to suggest the lines of thought that were current, and of enquiry and research. In view of the fact that these arsenes are substitution products from ASH_3 by the action of chlorine, phenol, or cyanogen and that ASH_3 itself is a gas which can be absorbed through the lungs and an intense poison, much research was devoted to the incrimination of arsenic as the *fons et origo mali*. The *British Official History*⁴¹ quotes with approval the opinion of Flury (1921) that "both the sensory irritant and the toxic properties . . . are manifestations of pure arsenical tissue poisoning". On the physiological side of "function" the matter is summed up as follows:

Whilst a final conclusion as to the true nature of these nervous phenomena (motor weakness, parasthensias, loss of mental control) is difficult to arrive at, since the dividing line between functional and organic changes is one which it is impossible to demarcate with firmness and accuracy, it is certainly true that no lasting organic lesion was produced. Perhaps a transitory poisoning of the central nervous system was responsible for the temporary loss of function on the motor or sensory side or the lethargy that was occasionally noticed.

The psychogenic side of the matter is examined later.

3. *Yperite.* The action of yperite is complex and derives in part from physical in part from bio-chemical properties. It has been summed up as follows:

A high lipid solubility enables it to penetrate the skin and cell-walls. Its necrotic effect on cell-substance has been variously explained. The

⁴⁰ The lethal toxicity of diphenyl-chlorarsine in strong concentration is approximately equivalent to that of phosgene, its toxic effects are analogous to, but less powerful than, those of yperite.

⁴¹ *Diseases, Vol. II, pp. 473 and 477.*

theories that it is due to decomposition, producing nascent HCl , or to the action of the sulphur atom, or to that of the highly toxic *vinyl* group, have by most been discarded in favour of the direct action on protoplasm of the molecule as a whole, and not of any of its radicles. However this may be, yperite is a most virulent general cell-poison, exerting a necrotising action on all cells with which it comes in contact. The slow but inexorable coagulant effect together with a slowly developing "inflammatory" reaction, and high susceptibility of its physical lesions to secondary septic infection, form the foundations for a clear-cut though complex syndrome.

On the pathogenic basis outlined above three clinical syndromes of gassing appear; their acute onset classifies them as "wounds", but with each hour and with each remove they tend more and more to assimilate with each other as "disease". They develop along two broad lines of pathogeny, deriving from the two great spheres of medicine, and of life, the physical and the mental. To-day, twenty-five years after, all "gas effects" merge in two worlds of human decay, which secure more prominence than they deserve, under the nosological titles "fibrosis" and "neurosis". Between the intense physical and mental action and reaction of the wounding sustained on the battlefield, and the drab and dreary aftermath of invalidity and pension life are contained a "medical history" of great variety and highest medical interest. Only a glimpse of it can be suggested in this history, but its evolution presents itself broadly in three stages—or "ages":

The clinical and pathological syndromes

- (1) The development of the trauma, onset of disease, its fastigium and "complications" in the field.

- (2) Convalescence and sequelae at the Base.

- (3) The aftermath of degeneration in the post-war peace.

Of these the first two belong in this chapter, the last to that dealing with "Repatriation" and concerned with the national as distinct from the military medical problems due to the first World War.

The clinical syndrome of gassing. The medical problems of gas warfare so far as the physical consequences are concerned relate to the types of lesions produced by *phosgene* and *yperite* respectively. The sickness caused was often such as to demand the highest professional skill and nursing. But it is important to recall that in the well protected armies of 1917 onwards,

only a small proportion of cases exhibited the "classical" symptoms and physical signs of grave gas poisoning; many men who reported to the R.M.O. presented no physical signs whatever. More and more the dominant problem of the medical service in "gas" warfare came to be that of *diagnosis*—chiefly as between "gassed" and "not gassed", of *prophylactic treatment* in cases of contamination with yperite, of immediate symptomatic amelioration in cases affected by the arsenes; and, above all, of *prevention or cure* at the front of "*neuroses*", *phobias and simulations*, conscious and unconscious. The account given of the major clinical and pathological features of "gassing" will therefore be in bare outline: these now belong, indeed, to general clinical medicine and pathology.

German instructions (translated by British G.H.Q.) state:

Owing to the similarity in the fundamental action of the different warfare gases (excluding yperite) it is almost impossible to draw conclusions as to the chemical nature of any particular gas that has been employed from the clinical picture or from the results of autopsy.

The acute lung irritants

Of the three groups into which cases are divided in the *British Official History*,

- (a) Acute, with violent onset (chlorine, chloropicrin),
- (b) Acute with insidious onset (phosgene, di-phosgene),
- (c) Chronic,

the two first provided straightforward clinical problems; the third around which has been waged one of the battles of post-war "gas"—over the question of "occult" gassing—comes within the sphere of "Repatriation" and pensioning, and is dealt with in the chapter concerning them.

The clinical syndromes produced by chlorine and phosgene respectively reflect their pathogeny:—in the first, choking, coughing, gasping for breath through irritation and spasm, retching, sternal pain and thirst followed by the phenomena of anoxaemia, weakness and lassitude; in the second the gradual development of anoxaemia of a high grade.

The essential lesion in all was "pulmonary oedema", the physical and clinical features and pathology of which do not differ fundamentally with the several gases. It may however

be superimposed upon varying degrees of bronchial irritation, and develops at different rates in fashion characteristic of the gas that causes it. However caused, it brings about, by mechanical interference with the respiratory process, a greater or less degree of anoxaemia and CO_2 retention, tending to cause violent inspiratory efforts and traumatic emphysema. An outline of the clinical picture is presented in Report No. 3 of the Chemical Warfare Medical Committee as follows.⁴²

Action of Suffocative Lung Irritants.—These gases act mainly on the alveolar epithelium of the lungs, causing acute oedema of the lungs, of very rapid onset, and thrombosis of the pulmonary capillaries. They have less effect on the air passages, but may have an irritant action on the pharynx, larynx, and bronchi. Chloropicrin is a powerful lachrymator, but Chlorine and Phosgene do not affect the eyes to any great extent.

Early Symptoms.—The immediate effects of irritation of the eyes may be prominent at first, but as a rule quickly pass off; within 3 to 12 hours after exposure to the gas the main symptoms, asphyxia and prostration, due to spoiling of the lung alveoli and accumulation of fluid in them, appear. In this stage the patient's respiration is rapid and usually accompanied by pain (often intense) in the chest; there may be violent fits of coughing, but the amount of expectoration is very variable, being profuse in some cases, and very scanty in others; in the more severe cases the patient is restless and anxious, or may be semi-comatose with muttering delirium. Therefore many patients will be unable to give a definite account of their symptoms, as loss of memory of immediate events may last for several days.

Patients with severe pulmonary oedema fall into two groups.

(a) Those with definite venous engorgement. In these the face is congested, the lips blue, and the superficial veins of the face may be visibly distended. There is true hyperpnoea, i.e., the breathing is not only increased in frequency but the actual amount of air reaching the lungs is greater than normal. The pulse is full and of good tension, and the rate is not often much above 100.

(b) Those with collapse. In these the face is pale and the lips of a leaden colour. The breathing is shallow, so that there is but little true hyperpnoea. The pulse is rapid (130 to 140) and weak.⁴³

In patients who recover, the oedema fluid is absorbed within a few days; in some cases signs of bronchitis or broncho-pneumonia, due to a secondary infection, persist for some time, but in most cases the lung returns to a condition which is normal except for the presence of some

⁴² "The Symptoms and Treatment of the late effects of Gas Poisoning" A description of the "action of gases" introduces the special subject and repeats the salient facts contained in the "Memorandum on Gas Poisoning in Warfare," issued by the D G M S in France on 1 Apr 1918.

⁴³ The parallel between "gassing" by phosgene and the lesions of "pneumonic influenza" is a remarkable one. The clinical phenomena of blue and grey cyanosis were related to a pathological condition which in each had the character of a "chemical inflammation"—a simple almost mechanical process—an outpouring of plasma, very different from the complex progressive and vital process that is the normal protective reaction against the pathogenic micro-organisms.

disruptive emphysema. In consequence, however, of the oedema of the lungs during the early stage, deficient oxygenation of the blood occurs, unless prevented by the administration of oxygen. The deficient oxygenation gives rise to wide-spread temporary injury in the various systems.

This clinical syndrome derives from a highly characteristic series of morbid happenings. It is reflected in the post mortem appearances. An epitome of this report among the Australian records states:

Effect on respiratory organs. "The essential lesions are pulmonary oedema, rupture of the pulmonary alveoli and concentration of the blood together with thrombosis." With death on the first day the lung is uniformly bluish-red in colour and almost solid with oedema; the interlobular lymphatics on the surface are distended with the same fluid. On section, frothy serous fluid and dark blood drips. Patches of collapse and emphysema extend throughout the lung substance. In death on the second and third day the aeration of the lung is greater. "On the fourth day serous fluid no longer drips from the lung on section, but commencing broncho-pneumonia and pleurisy may indicate that secondary bacterial infection has set in." The lesions in the tract vary with the gas. With chlorine and chloropicrin the mucous membrane of the larynx, trachea and bronchi may be intensely congested or even entirely destroyed, whereas with phosgene death may occur with but slight damage above. The lesions of chloropicrin are most marked in the smaller bronchi which suffer even more severe damage than with phosgene. The heart is "dilated, fluid blood in the large vessels—agony clotting in the heart chambers, the abdominal viscera engorged".

Of the "injury to various systems" referred to by the Advisory Committee by far the most important concerned the cardio-vascular changes, especially a characteristic concentration and thickening of the blood, which becomes indeed a major factor in the situation. In a severe case from one-third to one-half of the total bulk of the blood may have passed out into the lungs in the form of plasma, and this, together with the simultaneous effects of anoxaemia will focus the struggle for life in the heart. We have thus two prime factors tending to a fatal issue: obstruction to the ingress of oxygen and egress of CO_2 , and circulatory failure. These determine the essential problems in treatment.

Intimate pathology. The clinical syndrome and gross pathology set out above may now be linked with the essential pathogenic factors previously indicated by a brief outline of the course of more intimate events within the lungs.⁴⁴

⁴⁴ These were worked out chiefly by experiments on animals killed at varying periods after gassing.

The essential factors in the pulmonary oedema are as follows:—Chiefly, if not entirely through the intense toxic spoiling of the capillary walls and through dilatation and thrombosis, plasma is transferred from the capillary blood to the alveolar tissue and into the alveoli and bronchioles. It is removed from the first by the lymphatics, from the second by cough or reabsorption. The issues of life and death depend on the ratio between these processes. In phosgene cases a vicious circle develops—the intense anoxaemia causes further acidic changes in the lungs, leading to further oedema. Death is determined by the degree of this condition relative to oxygen demands. The effused fluid is poor in cellular elements other than those resulting from tissue death. The process is termed by American writers a “chemical inflammation”.

Syndrome of yperite. Few documents in the Australian War Memorial are professionally more satisfying than is the report dated 17th July 1917, by Major C. G. Douglas R.A.M.C., of the British Gas Directorate, of his investigation of the first casualties from yperite, (“mustard”). An epitome of this is presented as an adequate account of the matter to-day:

July 12-13 During the night of July 12-13 (Ypres area) was bombarded with shells marked with a yellow cross on the side. The gas was only slightly irritant to the nose and throat, causing a certain amount of sneezing, but no discomfort or oppression in the chest. There was no immediate lachrymation or irritation of the eyes. The immediate effects were so slight as to be practically unnoticed by many men. A few men experienced nausea and vomited while the gas bombardment was actually in progress. There is no doubt that the immediate effects produced by the gas were quite trifling. The majority of the men appear to have gone to sleep after the gas bombardment was over. From two to five hours later they were awakened with pain in the eyes which rapidly became intolerable. The eyes and nose were running, as if they had a violent cold in the head. Sneezing was very frequent, but there seems to have been no cough or discomfort in the chest as a rule. Tickling of the nose and burning and irritation of the throat were usually present. Nausea became marked and repeated vomiting occurred and persisted for some hours. The gas in question appears to have been some substance allied to mustard oil.

On July 14 I visited No. 47 C.C.S. about midday. By this time the vomiting had ceased and many of the cases were able to take food and the most striking feature was the inflammation of the eyes. In the worst cases there was intense photophobia, intense congestion of the conjunctiva, great oedema of the eyelids, and copious exudation both from eyes

and nose; there were very few cases who could keep their eyes open.

July 14 The face was frequently congested and swollen, small blisters were visible in many cases on the lower part of the face. A few had painful patches of blisters on the backs of the thighs and buttocks and even on the scrotum, with oedema of the scrotum and penis.

Though there was still some irritation of the nose and throat and much exudation from the nose, the cases exhibited for the most part no cough or pulmonary symptoms. A few cases had however been admitted showing definite pulmonary oedema, and one or two of these were gravely ill. Though perhaps one cannot absolutely exclude the "mustard oil" as the agent causing the pulmonary oedema, it seems far more probable that phosgene or some similar gas was the responsible factor. A few cases had been venesected at an early stage under a misapprehension as to the nature of the gas. The striking features of these cases were the trivial initial symptoms, the considerable delay before the onset of acute discomfort, and the rarity of pulmonary symptoms. It is not clear that there is any erosion or ulceration of the cornea in even the worst cases.

The fact that the action of this toxic substance was in the main limited to the skin, the eyes, the nose and throat suggests that it was given off from the shells in the form of a mist, i.e. actual particles not vapour, and so did not penetrate into the lungs as does a gas. One death is stated to have occurred, and it is quite likely that some deaths will occur amongst the cases exhibiting serious symptoms of pulmonary oedema. Save in the cases of pulmonary oedema there seemed to be no grave constitutional symptoms, even in those cases who showed the worst conjunctivitis, etc.

Corps Rest Station. **July 16.** About one-third of the total number of cases caused in the gas bombardment of the night 12th-13th July had been admitted to this unit—the mildest. The eye symptoms had almost entirely vanished in about one-half

July 16 of the cases admitted, no complications had appeared, and there seemed every reason to believe that these men will be fit for duty in a few days. About one-third of the cases who still had conjunctivitis showed pulmonary symptoms, varying from mild to pretty severe bronchitis, one or two of the most severe cases showing in fact slight cyanosis.

47 C.C.S. About half the admissions had been evacuated to the Corps Rest Station, and a small number of cases had been evacuated to the Base. There had been about ten deaths up to date. Of the deaths, one or two had occurred amongst the cases, who on July 14, had given the impression of suffering wholly or mainly from phosgene or some similar toxic agent. A P.M. examination had been made of one of these, and the trachea and bronchial tubes were found to be congested, the mucous membrane lining them to be eroded, and pulmonary oedema *absent*. These effects are similar to those described below, and are unlike the pathological changes produced in the early deaths from phosgene poisoning. The suggestion that such cases were due to the action of phosgene as well as of "mustard oil" must therefore be regarded as dubious. The most striking feature of the cases was that a very large proportion of those who had only shown severe conjunctivitis, and vesication of the skin, without any material chest symptoms on July 14, had gradually developed

severe pulmonary symptoms, and by this time a large number—probably not far short of half—of the cases remaining in the C.C.S. were seriously ill. The physical signs were those of acute bronchitis, broncho-pneumonia and in some cases lobar pneumonia. The temperature was raised somewhat. The breathing was in the more severe cases fairly slow but laboured, and there was definite though not deep cyanosis. There was a considerable amount of thick muco-purulent expectoration. In addition to this many cases complained of soreness or rawness of the throat, and loss of the voice from laryngitis was frequent. On the whole the gravity of the symptoms appeared to be increasing.

61 C.C.S. About one-third of the original number admitted were still detained. The history of these cases was much the same as those in No. 47 C.C.S., and about half the number were seriously ill with pulmonary symptoms. The M.O. in charge of the cases was of the opinion that more deaths were to be expected. The condition is, however, so novel that it is not easy at this stage to forecast the prospects of any of these severe cases.

The pathological changes were the same in each case. Intense congestion in the air passages from the epiglottis and larynx to the finer bronchial tubes, erosion of the mucous membrane and frequently actual stripping of it from the subjacent tissue (in one case the mucous membrane formed apparently a complete cast of the trachea), broncho-pneumonia patches in the lungs, and some pleural exudation. This detachment of the mucous membrane had apparently led to death in one case by occlusion of the trachea. The abdominal viscera showed no characteristic changes. The changes seen in the lungs are very different to those of acute pulmonary oedema produced by the ordinary acute lung irritants. The late onset of grave pulmonary symptoms and the remarkable changes produced in the air passages show that this gas employed by the Germans is to be regarded as a far more serious poison than the conjunctivitis, transitory vomiting and cutaneous vesication in the earlier stages would lead one to expect.

It is not necessary to enter upon an account of the more intimate clinical effects and tissue changes. The symptoms are in part produced by absorption and general toxæmia. The further course of the yperite wound is determined by secondary infection and by lower tissue vitality due to the widespread destruction and resulting fibrosis. The "burns" may be of first, second or even third degree: serious corneal damage, though rare, is a cause of late post-war blindness.

The ulterior effects characteristic of *the irritants* and of *yperite* may perhaps be summed up as "neurosis" and "fibrosis" respectively.

The morbid syndrome caused by the arsenes is essentially "functional" and affective. Though it varies greatly in severity with the dose and the agent, the general symptoms are those of intense "irritation" of nerve-

The arsenes

endings and nerve tissue, with appropriate reaction in the psychic sphere which may lead to extraordinary and bizarre symptoms, sensory and motor.

The main features of the blue cross poisoning were an immediate and intense local irritation of the naso-pharynx and occasionally a transient paralysis of parts of the nervous system of such a character that by many medical officers it was regarded, as being of a functional or hysterical nature.⁴⁵

The symptoms in the more severe cases (as described in the British History) were intense pain in the nose, mouth and throat, gums and jaws, tingling and smarting of the face, copious discharge from the nose, tightness in the chest, nausea and retching. The pain in the eyes and head resembles that experienced when fresh water gets into the nasal sinuses and, when severe, was agonising and accompanied by intense mental distress. An Australian R.M.O. noted: "Even the slighter cases felt and looked miserable—the picture of utter dejection and hopeless misery" which might go on to temporary mental derangement and the psychic effects noted above.

The prognosis was uniformly good: but a considerable number of the men reached Field Ambulance. In a large proportion of the casualties the symptoms were much milder than is suggested above.

IV

THE TREATMENT, HANDLING AND DISPOSAL OF GAS CASUALTIES

The first difficulty is that of deciding whether a man has really been gassed. Fear or malingering may induce a soldier, when gas has been in the air, to assert that he is gassed when really he has not suffered in any way. On the other hand, it must be remembered that many of the lung irritants have a delayed action, and that very grave symptoms may develop in a few hours in men who think at first that they have escaped unhurt.⁴⁶

As with other types of wounds the treatment of gassed men was part and parcel with the general problem of their collection and evacuation.

The local irritants. No special lines of treatment developed in connection with these. Solution of sodium bicarbonate was commonly used for the conjunctiva. In the

⁴⁵ *British Official Medical History, Diseases, Vol II, p. 481,*

⁴⁶ *Ibid, p. 417*

case of the arsenes, symptoms might persist up to 24 or 48 hours, but recovery was on the whole **Immediate treatment** uniformly good and rapid. Pain was relieved by the inhalation of chloroform, or by morphia.

In the later stages (says the *British Official Medical History*)⁴⁷ treatment should be directed to toning up the physical and nervous systems. The muscular weakness requires graduated exercises under discipline combined with an attractive diet. The mental condition is best met by a suitable environment and a happy combination of work and amusement. When sensory phenomena persist a cure will frequently be obtained by suggestion or by faradism.

The lethal gases. The rational treatment for poisoning is by antidote. This line was explored therapeutically during the war by the clinicians, and experimentally after the war⁴⁸ the endeavour to find means to neutralize the poison within the body had scant success. But in each of the two main groups—pulmonary irritants and vesicants—one special line of action so dominates the situation as to deserve the title of antidote. To prevent suffocation from pulmonary oedema, due to the irritants, oxygen was used. Its action in the anoxaemia from gassing can hold its place even with a scientific triumph so dramatic as the administration of barley sugar in the crisis of an acute hypoglycaemia.

In yperite poisoning the only line of antidotal action that counted was to neutralise it or its vapour before it had time to attack the tissues. An antidote for dichlor-ethyl-sulphide exists in chlorine, which combines with the molecule of yperite to form an innocuous compound. Whether as bleaching powder or chloride of lime, or the gas itself, chlorine came into general use to "decontaminate" the skin and clothing and thus prevent further damage. The potentialities of this action in first aid were not fully exploited.

⁴⁷ *Diseases, Vol II, p. 485*

⁴⁸ German "Instructions" observe that "A true causal treatment . . . is non-existent", but point out that the need for it "is not very great since . . . the warfare gases (i.e. the pulmonary irritants) are rapidly destroyed after they have done their damage". Inhalations of 2 per cent thio-sulphite, of $\frac{1}{2}$ per cent soda, and of soda and alcohol, were tried. On the Allied side ammonia inhaled from capsules had a great vogue in the early years as an "antidote" and a "stimulant" but was found almost useless and even harmful in serious cases. Since the war this line of treatment has been explored more scientifically. In experimental animals the intravenous injection of "urease", a ferment from the soya bean which forms NH_3 from the blood urea, has a measurable influence on the onset of oedema. Urease has also some constricting action on the lung capillaries, which is augmented by hypodermic injection of emetine. The use of urease and emetine is foreshadowed in the following from the German instructions—

"The most important thing would appear to be to rectify the principal *damage to the lung*, i.e. so to reduce the increased permeability of the walls of the lungs as to render them impervious and so prevent the exudation. Experiments on this point are in progress and are now being tried in practice."

The treatment of *yperite* may be dismissed with the statement that, apart from prophylaxis at the aid post and A.D.S., it was either antiseptic or symptomatic. As for the pulmonary irritants, the experience of the A.I.F. agrees with that of the British and other armies. The treatment of asphyxiation from gassing may be summed up as: rest, oxygen, and blood-letting. The first two are obviously complementary—diminish the demand for oxygen, increase the supply. Of venisection the French official *Clinical and Therapeutic instructions on gas-poisoning* issued in 1918 affirms that, "It is in oedema what the ligature of the artery is in haemorrhage." Though less éxuberant in enthusiasm, the general view reflects this dictum. The indication for rest in phosgene suspects was absolute; its application—by stretcher transport and so forth—need not be traversed.

Oxygen and Venisection. A singular interest attaches to the evolution of this paradox: oxygen to reinforce the haemoglobin, venisection which depletes it! Briefly, its validity was established through a curious give and take of experimental results between the physiologists (working on animals) and the clinicians at the front (working on men). The *British Official History* says:

Paradoxically, though venisection was recognised as of real value by those who had to treat casualties in the field, it was long before the physiologists working with gassed animals in England could find proof of its utility. . . .

The history of the use of oxygen in the treatment of gas casualties was, curiously, the very converse of that of venisection. So soon as it was realized that the asphyxial cyanosis was caused by pulmonary oedema, physiologists urged that it must be possible to alleviate it to some extent by the use of oxygen. Yet, when tried by medical officers, oxygen seemed to do but little good to acute casualties. The fault lay in the method of administration. Oxygen was at first given in the customary old-fashioned way, through a funnel held at some distance from the patient's mouth, and supplied only for such short time as sufficed to bring back the pink colour to the face, when its administration was stopped. The patient soon lapsed into his original cyanosis, and he benefited but little by such fragmentary supplies of oxygen.⁴⁹

The ingenuity of medical officers at the front, the inventive genius of technical experts at home, and the resources of

⁴⁹ Vol. II, *Diseases of the War*, pp. 413-414.

manufacture were focused on the problem of oxygenating the blood of men in the blue stage of asphyxiation from the effects of phosgene.⁵⁰

Space will not permit of entry upon the question of the precise indications for venisection. Briefly, its chief purpose is to forestall the development of a vicious circle in the early stages of oedema. Its combination with intravenous saline, or glucose solution, was less convincing, but has been developed scientifically since the war.

Atropine given with the idea of relaxing a supposed bronchial spasm, was found harmful. Ipecacuanha was much used by the French. In acute gassing alcohol is stated to have been of service. For heart failure, camphor and pituitrin were used hypodermically. The Germans approved digipuratum hypodermically. *Rest*, warmth and nursing complete the outline of treatment.⁵¹

General treatment

As with every other element in the medical problems of "gassing", a technique and art of diagnosis were created wholly on the basis of war experience broadly based on experiment and on observation of the respective results of immediate evacuation as contrasted with those of treatment in the field. Ultimately the service attained and disseminated a working knowledge of gas effects sufficient to bring the handling of gassed men into line with that of the sick and wounded. The diagnostic problem came to lie chiefly between the physical and "functional" effects of gas. Discrimination was based on familiarity with the significant features of each.

The problem of diagnosis

During 1918 "gas" became a dominant feature of the environment of the front lines and traces of yperite a frequent constituent of the atmosphere. "Gas effects", varying from slight hoarseness through every stage of tracheo-bronchial and

⁵⁰ During the war there occurred notable developments in scientific precision in the use of oxygen, and in the mode of its employment. It was used in gas warfare and influenza, and, physiologically, in the warfare of the air and of the submarine.

⁵¹ The German instructions previously quoted say The indications for treatment have been summed up as directed to (a) the cause of the damage as such (causal treatment). (b) The irritant effects on the mucous membranes. (c) The direct damage of the lung tissues. (d) The immediate consequences of this, especially as regards the breathing. (e) The indirect consequences, the concentration of the blood. (f) The disturbance of the circulation. (g) The subjective distress. (h) Secondary infections and sequelae (i) Unforeseen accidents.

pulmonary irritation were constant—either from “gas” or “influenza”!

From this conjunction of uncertainties, mental and physical, was born the morbid syndrome “N.Y.D. Gas”. On 8th January 1918 G.H.Q. published *General Routine Orders 3127 and 3128*, as follows:

“Gas poisoning—disposal of doubtful cases.”

“When, on admission of an officer or soldier to a medical unit, there is a doubt as to whether the patient’s condition is due to gas poisoning or not, the casualty will be reported as N.Y.D. Gas, and the patient retained in one of the medical units in the Army Area, until it is definitely ascertained whether the diagnosis is one of gas poisoning or otherwise.

“Cases which are reported as N.Y.D. Gas will not be classified as battle casualties unless and until they are definitely diagnosed as cases of gas poisoning by the O.C. of the Medical unit in which the patient is retained.

“As the diagnosis of medical officers in charge of fighting units cannot be taken as final in these cases, the report of Wounded (Gas) at duty will not be made.”

To implement this order “gas centres” were established⁵² in Army areas, run on the same lines as those for “N.Y.D.N.” By a peculiarly interesting process of evolution these came also largely to coincide in their problems—namely as between the physical and the psychic or the “moral” element in the disorder.

The first gas used, chlorine, was the most dreadful and terrifying. From the tradition of it, from the mysterious “delayed action” of phosgene and of yperite, from the impersonal nature and alchemic associations of the new weapon, and in particular, from the uncertainties and inconvenience of gas alarms and the gas mask, was born an apprehension or even a “phobia” that decreased little with familiarity.⁵³

⁵² For N.Y.D.N. cases—“Not yet diagnosed (nervous)” see Chap. 4. As with “N.Y.D.N.” provision on almost precisely similar lines was made in the German Army; the word “alleged” being inserted on the “wound or sick label”. “The great majority” of indefinite cases would be “returned to their units”, the remainder sent for treatment in “gas stations” the personnel of which were “familiar with the treatment. . . .” (“Supplement”—dated May 1918—to the German Official “Instructions” already quoted.)

⁵³ This is emphasised by British and American writers. In particular the effect on young recruits of excessive insistence on the dangers of gassing is stated to have produced, especially in the American Army, immense numbers of “N.Y.D. Gas.” Of the 224,089 battle casualties in the American Army 70,552 (31.5 per cent.) were from warfare gas, the mortality among them was less than 2 per cent. These figures contrast with 185,706 and 9.72 per cent. respectively in the British Army and 16,822 and 11.82 per cent. in the A.I.F. The difference is stated to have been largely due to this factor. (*British Official History, Diseases of the War, Vol II*, p. 497 and Vedder, *The Medical Aspects of Chemical Warfare*, p. 245.)

N.Y.D. gas if it be made to include the "N.Y.D's" (so to speak) of the post-war gaseous aftermath, accounted for a large proportion of the "gas effects" that make up the total experience of the A.I.F. On both the military and the medical aspect this physico-mental syndrome was a close compatriot of "shell-shock" and "N.Y.D.N." In each of them physical and mental factors, apprehension and some more or less minor physical damage, were the pathogenic agent in a labile symptom-syndrome which, unless met by appropriate and energetic action, was apt to congeal in a distinct, if not *specific* morbid state. The three conditions differed in the relative predominance of the physical and mental constituents—in "shell-shock" the physical and the mental elements over-lapped, since the organ damaged, the brain, is responsible for both mental and neural functioning. At the "N.Y.D. Gas" centres discrimination was based chiefly on the presence or absence of the physical features or concomitants of "gassing"; in the "N.Y.D.N." centres it was based on the presence or absence of pathognomonic "nervous" phenomena.

Like those for "N.Y.D.N.", the "gas centres" became treatment centres for the psycho-physical and the milder clinical effects of gassing. Together with the special Rest Stations they were of first-rate military importance in preventing wastage from the "Army" area.

"D.A.H." At the Base the distinction of the physical effects of gassing from the emotional ones becomes a matter of interest for another reason; the acute injury inflicted, especially, by pulmonary irritants and the chronic lesions left by gas wounds helped to create another major problem of military medicine—the "effort syndrome"—by superimposing a "neurosis".

Except a few tear bombs thrown by the Turks no gas was used on Gallipoli and by the time the A.I.F. reached the Western

Front the original procedures for handling gas casualties had been fairly well established. Changes were now gradual and consequently little comment appears in the medical diaries of the A.I.F. either as to the increasing proportion of gas casualties, or as to changes in the method for dealing with them. Yet even at the end of the War the British arrangements for handling gassed men were still in a state of flux. When at

Handling of gas casualties in the field

the end of 1916 the medical service was relieved of all responsibility for gas-defence, it said in effect a "goodbye to all that": thereafter the medical methods for dealing with gassed casualties simply developed as part of those for the general concourse of wounded and sick. No special medical department was created in the British Army for dealing with the ever-changing medical problems of chemical warfare, or for the special technical training of personnel therein. In conformity with this no special units, staff, or even scheme of arrangements were authorised or established for the routine handling of gassed cases.⁵⁴

The records of the A.I.F. suggest that the failure to transform the machine built up by the medical service for "defence" into a medical one for dealing with the many novel problems of "gassing" was unfortunate, and was reflected in the work of field, base and home units. But the general principles both of *treatment* and of *movement* stand out clearly enough.

Handling of casualties due to pulmonary irritants. Here the vital matter was the pathological time-limit. Gassing was essentially a "wound". And even more inexorably than with other battle-wounds the movement of the gassed man along the route of evacuation was dominated by a pathological time-constant, which determined within comparatively narrow limits the number of hours after severe wounding available for his movement from the front line to the treatment centre, whether dressing station, special "gas centre", or casualty clearing station. This time-factor, and also the transportation trials, differed materially in the two "lethal" types of gas poisoning. The urge for treatment was incomparably the greater in the case of the pulmonary irritants, since in these it was determined by the onset of oedema: with yperite the urge was less, the effects being gradual, though not less certain in the shape of cellular necrosis and secondary infection. The medical problem was and must always be to forestall the onset of

⁵⁴ Early in the war a Committee of Consulting Physicians and Physiologists summoned by the D.G.M.S. drew up a memorandum on gas poisoning, which, with revisions, was issued in June 1915, in July 1916, and in April 1918. From 1917 onwards brief supplementary statements were sent to all medical units. In each Army some provision was made through the Consulting Physicians for interpreting the principles laid down by this Committee. Special lectures were given at the Army Schools. In January 1918 the D.G., A.M.S., at the War Office, co-operated with the Chemical Warfare Department and Medical Research Council in appointing a "Chemical Warfare Medical Committee" to co-ordinate information based on reports from all available sources. Interallied gas conferences were held in Paris. (See *British Official Medical History, Diseases, Vol. II, p. 248*)

irreversible damage—in this case the fight for life against pulmonary oedema was supported by rest, venisection, and oxygen, just as in the case of wounds the danger from shock and infection was met by resuscitation and excision.

Yperite. Here the problem was that of decontamination—the chief medical problem of gassing in the last year of the war. It is not necessary to enter into its technique: that is part of textbook teaching to-day. In the Great War the task fell chiefly on the R.M.O. and A.D.S.

The arsenes. Here the crux was diagnosis. In general, if a man had been seriously damaged by an irritant gas the fact had become apparent by the time he had reached the A.D.S.; the problem of diagnosis, therefore, lay chiefly with the minor effects of these and the arsenes. With the arsenes diagnosis was entirely circumstantial and intuitive—or else by the method of “wait and see”.

Movement. As with “abdominals” and other special wounds, British procedure in gassed cases was based on the principle of departing as little as possible from the normal scheme of evacuation. The British reduced to a minimum the provision of specialist units, personnel, and equipment either for treatment or for transport. In this they differed fundamentally from the French and Americans, who employed a system of “triage” that is of clearing special cases to special units—the well known “system ‘Z’ ”.

The simplification of routes followed by the motor ambulance convoys was essential to rapid working in rush period (says the British Medical History); and the detailing of cars for (any) special service to a particular C.C.S. led to delay and confusion. Moreover, the “switch” system of working grouped casualty clearing stations gave better results in the aggregate. . . . It was therefore accepted as a necessity that in the Army zone each medical unit should contain amongst its personnel enough of all ranks adequately trained, and at any rate a small amount of equipment for the treatment of gassed cases.⁵⁵

Handling, in the A.I.F. 1. Cloud gas period. The experience

⁵⁵ *British Official Medical History, Diseases, Vol. II, p. 500.* This upholds British practice in the war as more suitable to “normal” warfare. The fact however is recorded that the French “Z” system of special medical units introduced at the end of 1917, “was communicated by the D.G.M.S. (B.E.F.) to the D’s M.S. of the British Armies in January, 1918, with a view to their imitating it”. The rapid movement of events in 1918 may have interfered with this project, of which no evidence is found in A.I.F. records.

The following note on the procedures in other Armies seems desirable.—

The French method, 1915-16. “ . . . Au front et au cours de l’année 1915, nous n’avons pas fait de différence entre un gazé et un malade ordinaire . . . ”

of the A.I.F. illustrates British procedure from 1916 onwards. But as already stated and as shown by the figures given below,⁵⁶ the A.I.F. had little experience of cloud gas; its gas casualties really began with the lethal shells that were flung at the approaches to Pozières on the Somme in July, August and September 1916. There were 150 casualties; they were evacuated by the normal routes and 10 died.

2. *Lethal gas period*—July 1916-July 1917. Only on two occasions in this period did the gas problem trouble the medical service of the A.I.F.—in the 5th Division tour at Bullecourt and in that of the 3rd at Messines. Between May 14th and 22nd, the 5th Division sustained 100 out of the 150 gas casual-

1917 "Il faut avouer qu'une bonne organisation du service médical des gazés n'a existé qu'après l'apparition de l'ypérite, en juillet 1917. . ."

1918. "Nous voilà en 1918 Tout va changer . Une branche nouvelle, la branche des gazés . . ."

It would seem probable that in future warfare some system of triage will be necessary, and this may follow the lines developed by the French, which have been summed up as follows.—

"L'organisation médicale du service des gaz aux armées a comporté des organes de traitement d'urgence: postes de lavage et d'échange de vêtements; et des organes de traitement définitif, ambulances et hôpitaux Z."

American system The American scheme was based on a special medical gas department, with Staff Office, directly under the Chief Surgeon (who corresponded to the D G M S). Treatment and disposal were based on "mobile gas hospitals" of 100 beds each, specially equipped and staffed, one to each Division. To each Corps were allotted three "Mobile Gas Hospitals" of 1,500 beds each.

The German policy. As already noted the German system was based on the general idea—which obtained throughout their medical organisation—of restricting as far as possible evacuation from the Army area. Special units and trained staffs were established.

⁵⁶ SUMMARY OF GAS CASUALTIES IN FRANCE

December, 1915 to November, 1918.

Force.	Numbers gassed.	Percentage of total wounded (excl. gas).	Case Mortality per cent.
<i>December, 1915-August, 1916:</i>			
British	4,207	..	24.08
A.I.F.	156	0.65	7.69
<i>July, 1916-July, 1917</i>			
British	8,806	.	6.04
A.I.F.	1,374	2.42	2.26
<i>July-December, 1917</i>			
A.I.F.	3,702	12.52	1.89
<i>July, 1917-November, 1918:</i>			
British	160,526	..	2.55
A.I.F.	15,727	22.79	1.85

(The British figures—taken from *British Official Medical History, Diseases, Vol. II, p. 517*—discriminate exactly the types of gas. It is not possible to do this for the A.I.F. The approximate British total of admissions to medical units of gas casualties in France is given as 180,983 and the total deaths 6,062.)

ties suffered by the I Anzac Corps.⁵⁷ The course of these can be followed from the following summaries of unit diaries:

A.D.S. Noreuil Valley 14th May. Heavy barrage of gas shell on A.D.S. and evacuation route; most medical officers and bearers slightly gassed but remain on duty.

M.D.S. Beugnâtre. Admissions and discharges from 6 a.m. numbered 70 of whom 38 had been gassed. Kept at M.D.S. for a time, oxygen given when required; most "in good condition". A "forward gas centre" was formed here, where also were treated "such minor casualties as required only a few hours rest". All "shell-shocked and gassed cases" went by M.A.C. cars direct to No. 47 C.C.S. at Varennes. "Drift gas" cases and "severely gassed stretcher cases" to the gas centre at Avesnes les Bapaume.

"Forward" Gas Centre: May 14th. (3rd later 14th Fld. Amb.) Two large marquees (store tents) combined, with curtains rolled up, formed "an ideal open-air shelter". "50-60 shell gas cases" received, all mild. Patients lie on stretchers on trestles and three nitrous oxide inhalers are attached by tubing to oxygen cylinders ready for emergency. (This method was much improved on later). "The great difficulty is being sure they are gassed": most gave a history of repeated small doses due to necessity of removing helmets at night. Light cases allowed to walk; pulse and heart observed. 30 evacuated to Varennes, 15 retained for treatment and returned to unit in 8 days; 6 retained 14 days as too severe to move. They are kept rigidly in bed for the first six days; then, if well enough, gentle exercise with pulse checked to test cardiac condition.

At this time sudden death from phosgene was attributed to toxic action on the heart. It was found that resolution of this syndrome was, conveniently for the clinician, presaged by a bradycardia. When well enough patients were sent as sitting cases by M.A.C. to Varennes via Becordel.

Messines. The casualties from this shelling (lachrymator, chloropicrin, and a little phosgene) were evacuated through the A.D.S. and M.D.S.

3. *The yperite-arsene period*—July-December 1917. The "bombshell" advent of yperite was met with remarkable promptitude. The preparations made by the 3rd Field Ambulance for the Battle of the Menin Road, September 20th, were precise and appropriate. The following is epitomised from the diary of Major May:

S/Sgt. and two O/r will be responsible for treatment in the "Gas Cupola". (a) All mustard gas cases will be attended by the special staff who will wear the small box respirator and rubber gloves. (b) The patients will be stripped outside the cupola and then carried inside on a clean stretcher, in a clean blanket and sprayed with 5% Sodae Bicarb. with a Vermorel sprayer, in particular groins and armpits. Eyes and

⁵⁷ 5,000 lethal gas shells thrown into Noreuil Valley between April 20-22 caused only 5 casualties

nose washed out and mouth gargled with the same. Then dried and clothed in pyjamas, well covered with blankets and sent on to the dressing cellar as an ordinary case, e.g. for venisection. (c) The clothing will be spread out away from traffic, sprayed, and then sent to salvage specially labelled.

Except for certain special provision for decontamination of clothing these dispositions might be those of an A.D.S. in 1918.

The Battle of Cambrai, in many other respects one of the most instructive battles of the war, was also notable for a German experiment in new offensive gas tactics. Most of the casualties went through No 3 A.G.H. at Abbeville—at the time a line of communication gas centre.

1918: Consummation of gas warfare. In February and March before their great offensive farther south, the Germans threw an immense weight of gas shell on Second Army front at Messines and Ypres and not least on the Australian Divisions. The gas trials of an R.M.O.—and his patients—and the general atmosphere of gas warfare can be read from some notes (by Major May, then with the 11th Bn.) concerning part of this period in the line March 8th-22nd.

7.3.18. Support Coy. of the 9th Bn. (to be relieved) badly gassed by Yellow and Green Cross. About 120 passed down with sore streaming eyes but only a few stretchers.

8th. Moved into line (near Wulverghem). Shelling constant, one man gassed (Blue Cross). Kept him to observe.

11th. Plenty of shelling. *12th.* Dressing case after dusk began to cough—phosgene but took no harm. . . . *15th.* Easy day but half the men talk in whispers and a lot have quite lost their voice. Some Blue Cross. *16th.* Sick parade a lot of men with husky voices evidently due to mild gas. . . .

18th. The usual sick parade of whispering voices. *19th.* A lot of sick men to-day, some with a dilated heart and rapid pulse, so I evacuated 20 of them, and wrote a report to the A.D.M.S. *20th.* Evacuated 23 mostly with asthenia and debility. *21st.* Men tired out. Officers all husky and coughing. Sick parade large but men not so bad since they have been relieved of fatigues. *22nd.* Handed over to 9th Bn.

In personal letter—by way of comment :

We had three solid bombards mustard, phosgene and chloropicrin but though a lot got laryngitis and tracheitis, I kept them in and relied on their pulse for evacuation. The men who gave out first were over 40 or quite young and nearly all had some chest deformity. I had a very trying time—it hurts to send men forward who can only whisper and cough till they vomit; but so long as the heart held I was firm. I don't think the men quite agreed with my Hunnish methods.

At a later date more of these men would have gone "N.Y.D. Gas".

How gassed cases were dealt with at a C.C.S. has already been described.

After the German offensive the Australian divisions suffered chiefly from the cleverly-planned German bombardments with yperite, sometimes disguised by other shells, at Villers-Bretonneux in April and May; in the villages close behind the lines; in the valley and woods near Horleville in August; and during the penetration of the Hindenburg Line at the end of September and beginning of October. The British during this year were using gas projectors in an increasing degree—producing a cloud—usually of phosgene—in the enemy line by the simultaneous burst of up to 1,000 large containers fired from projectors dug into the ground. During the summer these attacks were made almost daily and were much feared by the Germans.

During 1918, with increasing exactitude gas casualties were discriminated for treatment and disposal in the same way as "walkers" and "stretcher cases" forming thus a third main group. The position of the "gas centre" tended to move forward but not in front of and commonly in close proximity to the M.D.S. The arrangement in the last phase of the war is well shown in *Volume II*.⁵⁸ Provision was made at these stations for diagnosing and dealing with the several types of gas, in particular for decontamination of yperite ("mustard gas"). Cylinders of oxygen and supplies of pyjamas were part of the normal equipment of the field ambulance for these stations. Cases were evacuated by M.A.C. to a special casualty clearing station or to the "N.Y.D. Gas" centre controlled by the D.M.S. "Army".

During three years, after many trials and much failure, there were built up at the expeditionary bases a system of special gas centres for treatment and a special formula for "return to duty". The stage was one of great importance in the clinical history of the gassed man—the still labile gas syndrome might congeal into the structural and functional rigidity of invaliding and the pensioned life—informed and illumined perhaps by mental resilience; or it might resolve into a recovery adequate for military purposes, but with the

**The handling of
gas casualties in
the A.I.F. 1918**

⁵⁸ See sketch maps and diagram on pp. 726-7, 729 and at p. 732.

possibility of future degeneration—or of “U.R.T.I.”! (Upper Respiratory Tract Infection.)

In no phase or stage of gas handling was the lack of specific direction felt more than here. This is acknowledged in the *British Official History*; and borne out by the records of the Australian General Hospitals, and by figures. Till 1918 the possibilities of definitive treatment of gassed men at the Bases in France were scarcely touched. Thus the records of No. 3 A.G.H., (which from January 1917 until the second half of 1918 was the “centre” for the southern Lines of Communication for “gassed”, including “N.Y.D. Gas”) recorded little but deaths and transfers—to Britain! Not until the immense casualties from yperite and the new German technique had made wastage from “gas” a factor of great importance in the military situation, was provision made for special treatment. The results were striking. Analysis of figures collated by the Special Treatment Centres which were established in March 1918 justifies an estimate that some 35,000 cases had been retained at the Base 2 to 3 months longer than necessary. Of 6,607 gassed men who reached the Base in the week ended 19th March 1918, 78.0 per cent. went on to England, 1.1 per cent. died; but for 10,550 who reached the Base in the 4 weeks ended November 9th the figures were 33.0 and 1.7. In a series of yperite cases it was found that, of those who reached the Base, 60 to 70 per cent. could be cured in France within 6 weeks; and except for a small number of serious cases all had returned to duty within 2 months.

Britain: The hospital system. In Great Britain men passed with other sick and wounded through the British hospitals. Here quite unnecessary scare and mystery combined to complete the transformation of a large proportion into “effort syndromes”; and these we pick up in the A.I.F. Depots in the United Kingdom. The report of Colonel McWhae, the A.D.M.S. there, has been epitomised as follows:

Early in 1918 a large number of gassed cases accumulated in Command Depots—as many as 1,500 at one time. Some of the worst were sent to the Group Clearing Hospitals. Two types could be distinguished.

(i) Cases with well marked bronchial and general symptoms, e.g. cough, dyspnoea, praecordial pain, vertigo, palpitation, pulse rate 90 to 130 and irregular. Some had vomiting, pain after food and flatulence, Rhonchi

were generally to be found in the lungs, and the apex beat was diffuse. Many hundreds of this type were boarded "unfit for active service".

(ii) Patients who showed no bronchial symptoms, but who complained of dyspnoea, praecordial pain and excessive fatigue after exertion. In these the pulse rate varied from 70 to 130 and was often irregular, but the heart was normal and no physical signs could be found in the lungs. The symptoms in many of these were similar in all respects to D.A.H. cases; and they were dealt with in the same way. After a short rest in a "Group Clearing Hospital", with suitable diet and tonics, these men were returned to Command Depot and there were found to tolerate graduated training, and to improve with it. Few had to be re-admitted. Investigation of a large number of these cases showed that a very large proportion had been only slightly gassed and that no organic signs of disease were present, but that functional symptoms were not uncommon "owing to increased suggestibility". Medical officers were directed not to draw the attention of gassed soldiers to subjective symptoms although complaints made by the soldier himself were not ignored, "as they formed a valuable index to his condition". Dark glasses or eye shades were to be discouraged, as inducing functional photophobia.

Personal oversight of several hundred gassed cases convinced Colonel McWhae that "very many of them required no more than 4 weeks' training before transfer to the O.T.B.", and that the majority of these became fit for return to their units.

Here for the present we leave the Australian soldier who had become a "battle casualty" from poison gas. We shall meet him again, in greatly augmented numbers,⁵⁹ in the pension problems of "attribution" and "aggravation". The experience at the moment of the medical service that so far had treated him was summed up as follows in September 1918 by Colonel Maudsley, who since 1916 had been Consultant and Boarding Physician to the A.I.F., and who was reporting to General Howse upon the Invalid Boards in Britain.

Gas Poisoning. Cases under this category mostly suffered from Effort Syndrome. Later there were a number who were suffering from Bronchitis and Fibrosis of the Lungs and Emphysema, and some from Asthma without any history prior to gassing.⁶⁰ Some were suffering from Neurosis.⁶¹

⁵⁹ In the American Army the total casualties reported as having possibly been gassed were 70,552. By 1925 300,000 had applied for war relief alleging "gas disability". (Vedder, *loc. cit.*, p. 245).

⁶⁰ Poisoning by chloropicrin may be followed by a "curious" diathesis resembling allergy; recovered men or even animals might become asthmatic in the presence of minimal amounts in the air.

⁶¹ The history of the "Australian Gas Mask", and an informative study of the evolution of "offensive" and "defensive" gas are given in an article by Prof. W. A. Osborne, "Poison Gas and the Evolution of the Respirator", *Medical Journal of Australia*, 25 Nov., 1939.

CHAPTER II

MORAL AND MENTAL DISORDERS IN THE WAR OF 1914-18

I

THE HISTORICAL BACKGROUND: THE REDISCOVERY OF MIND

PSYCHOLOGY, though the youngest of the sciences is one of the most ancient of human interests. It is older than Aristotle, who first christened it; and from his day onwards it remained, for nearly ten centuries, a department of philosophy rather than a branch of science.¹

The war of 1914-18 coincided broadly with the birth of a new era of philosophic thought on the nature, content and working of man's mind (psychology) and of its aberrations (psycho-pathology). The essential feature of this new era was, and is, the *application to the problems of the mind of the methods of inductive science*. It is essential to the proper understanding of the psychiatric history of the "Great" War that any account of it should be preceded by a *resumé* of the change in thought which had brought about this vast readjustment in the philosophic and the professional outlook of Medicine—a readjustment which (it is hardly an exaggeration to say) has "turned the medical world upside down".

An impediment. Unfortunately, even for the purposes of this history the clarification of this subject, so closely affecting both the welfare of the soldier and people and the economy of the nation, is clouded by the looseness of psychiatric terminology. The identification of causal relations between any series of phenomena, and the discrimination therein of a new morbid syndrome, necessitate the creation of an appropriate language. Psychological medicine has suffered from the curse of Babel, and will continue to suffer until two things happen—till (a) the observation and identification of the relevant phenomena are sufficiently

¹ *The Subnormal Mind* by Cyril Burt (Oxford University Press, 1935), p. 342.

exact and complete to become stable, and (b) the etymology rendered possible by this stability shall be scientific—that is, shall employ its word-roots consistently with their accepted meanings.

Some such prologue is essential even to a study as simple and straightforward as the present one—the more so because simplicity requires that the words used have a definite meaning. The character of this work precludes any attempt to make a “break-away” in this matter—for which task, indeed, the writer is unequipped. All that may be attempted is to use words that will convey “the greatest meaning to the greatest number”.

One of the most widely quoted, and misquoted, aphorisms concerning grave mental disorder and disease—and one even more applicable to the less definitely organised forms of disorder—is that of Charles Mercier, which stated that “insanity is a disease of conduct, not of intellect”.² Apart from its legal application the significance of this “hard saying” will vary with the standpoint, biological, pathological, or sociological, from which the relevant disorders of conduct are examined. The weakness of it from a scientific point of view is evident. Mental “disease” can only be studied “scientifically” as a biological and physiological not a behaviouristic phenomenon. Yet in view of the limitations imposed by our present ignorance of the basic structure of “mind” and of mental disease and disorder it is the most convenient description of those morbid states of being and becoming with which this chapter is concerned.

On this basis, from the point of view of military “behaviour” the conduct-disorders of the war fall broadly in three groups, which may be discriminated as

- (1) *Delinquent conduct* brought about by “wilful” disregard by the person of the social rules (military or civil) which are accepted as binding on the community of which he is an individual element.

² Quoted from Wood Jones and Porteus (*Matrix of the Mind*, p. 288) Devine (*Recent Advances in Psychiatry*, p. 1) gives “disorder” for “disease”. The original reference is not available to the author.

- (2) *The "psycho-neuroses",*³ in which the patient is in a greater or less degree aware of his condition and the disorder may be dealt with, and its underlying cause treated with the free and voluntary co-operation of the patient.
- (3) *The "psychoses",* in which the person is not, or is imperfectly, aware of his state, and in which the conduct-disorder is usually so grave as to call for compulsory segregation while the disorder continues: in everyday language, "insanity".

Distinct in their social significance and in their medical involvements and probably also, in some degree, in their pathogenesis, nevertheless these three major groups of conduct-disorder overlap, more or less widely, at their clinical and administrative boundaries. The importance of this overlap can hardly be too greatly stressed; we may recall that, frequently enough to constitute a major tragedy, the question whether a soldier should be "shot at dawn" as a military criminal, or be discharged possibly as a battle casualty with a "wound stripe" and war-pension, was determined by the opinion of a medical officer as to which side of this clinical overlap the soldier's behaviour should consign him.⁴

Psycho-somatic disorders or diseases. The relation between psychical and physiological factors in the creation of morbid states of mind and body is so vast and controversial a matter

³ *Recent Advances in Psychiatry* by Henry Devine, 1929, pp. 14, 15, and 290. "There is nothing distinctive, invariable, or clear-cut in the symptomatology of the various psychiatric syndromes, nor even can the neuroses be separated with any degree of precision from the psychoses. . . . Many attempts have been made to formulate the distinctions between a psycho-neurosis and a psychosis. There is no clear-cut clinical distinction between the two; all kinds of admixtures may be manifested, a 'psycho-neurosis' may develop into a 'psychosis', and, conversely, the latter may exhibit at times the characteristics of the former. At the same time the difference between the two types of reaction is intuitively sensed by society for reasons which become evident when their psychological characteristics are contrasted. . . . In the psycho-neurosis the patient is oriented to external realities. . . . In a psychosis, however, the irruption of images, feelings and cravings, into consciousness leads to distorted views of external reality and to falsification of facts."

⁴ Similar "conundrums" in discrimination provide highlights in the history of the mental traumata of the war. For example the embittered debate in the British House of Commons in 1915, whereby by request of the House, "cases of actual insanity . . . were humanely indicated by the noncommittal designation, 'nerve strain'" (Maj A. W. Campbell, *Medical Journal of Australia*, 15 Apr. 1916); and the disputes between the Australian Returned Soldiers' League and the Departments of Defence and "Repatriation" regarding the relation between "shell-shock" and "insanity", may be instanced as having their origin in the clinical and social overlap between the "psycho-neuroses" and the "psychoses". At the other end of the series comes the problem of the line between "cowardice"—a military crime—and "nervous breakdown"; between "malingering" and "hysteria" (the "unconscious malingering" of Babinski).

that little more can here be attempted than to summarise the most significant features of this branch of psychiatry. In the war of 1914-18 the subject centred chiefly round the problem of "D.A.H."—"disordered action of the heart". Inasmuch as there lies in its study the hope of an understanding of the interaction of mind and body in disease, the vista opened up is extensive and still extending.

Accordingly with certain additions, this chapter will examine the "moral" and "mental" casualties of the war under the headings set out above. For convenience—and it may be contended that this is the proper order—it will begin not, as usually, with the more or less organised diseases and disorders of the organ of mind (the "psycho-neuroses" and "psychoses"), and their reflection in the somatic life (the visceral somatic "neuroses"), but with an examination of the medical aspect of the *moral delinquencies* most prevalent or characteristic in Australian experience in the war.

"*Determinism*" and "*free-will*".⁵ However necessary to

⁵ All concepts of mental disorder revolve around this question. Thus, J. B. Watson's "behaviourism"—the popular system of social psychology in America—is based on a rigid concept of physiological determinism, the "conditioned reflex". Bernard Hart more logically—if with a bias only less intransigent toward a rigidly "psychic" concept—defines the principle in general terms as follows.

"Before we endeavour to discover the causes underlying morbid psychological phenomena we must be convinced that our quest is reasonable, we must firmly believe that such causes exist. This belief involves the adoption of psychological determinism—the doctrine that in the psychical world, as in the world of matter, every event must have a cause. Provided that the necessary antecedents are present, then the result will inevitably follow; and if we see the result, then we know that certain definite causes must have combined in order to produce it. Chance has no more part in psychology than it has in physics. . . . Whatever our private philosophy may be, so long as we are thinking psychologically and scientifically, we must subscribe to all the implications of the law of causation." (*The Psychology of Insanity*, pp. 59-60).

Of the relation between mind and body this has been said with authority (*The Neuroses in War*, Edited by Emanuel Miller, p. 86):—"Still, we do consider the patient more than his disease and we realise that, in his reactions, mind and body both play a part, and that often the same symptoms and signs may result in one patient from physical causes and in another from psychical causes. We talk now of psycho-somatic medicine, bodily illness brought about by emotional disturbances, and so we do not expect quite such precision in the distinction of organic from functional disease, recognising that functional illness can and does pass into organic disease.

"Rather are we concerned with reversible and irreversible tissue change, for the recent advances in micro-chemical knowledge make it probable, if not certain, that the most transient psychogenic change does involve tissue alteration of some sort or another.

"However, it is necessary to be able to recognise the difference between reversible 'functional' illness and irreversible 'organic' disease, since only so can an intelligent prognosis be given and adequate treatment be undertaken."

And the most convincing summary of the problem of the "unconscious" will is thus given by Henry Devine (*Recent Advances in Psychiatry*, 1929, pp. 279-280):

"Consciousness guides the activities of the individual rather than originates it, and the sources of activity are mainly determined by unconscious processes. When the psychiatrist turns the light of his own consciousness upon the psychotic subject,

the creation of a science of mental medicine it may be to accept the principle of psychic determinism, in the study of disordered conduct in war it seems inevitable, as a practical basis for theories of pathogeny and principles of treatment, to postulate some degree of "free will" as being the ultimate determinant in intelligent and "normal" conduct.

On this hypothesis some morbid derogation or distortion of "will", whether for exhibition or inhibition, is associated with all disorders of conduct that come within the scope of psychiatry; and this is apparently true whether the defect or distortion of will be wholly or chiefly *psychogenic*, as in hysteria and other manifestations of psycho-neurosis and in some forms of insanity, or *physiogenic*, as in Parkinsonism following encephalitis lethargica, in general paralysis ("G.P.I."), or in injury to the frontal lobes of the brain, and as was for a time supposed to be the case in "shell-shock". As discerned by the ordinary processes of observation and induction, defects of self-control, of purpose, of will—in brief of "character"—as well as of "temperament", "disposition", and "constitution" have a part in determining, not only the standard of military achievement, but also the genesis and efflorescence of moral and psychic, and even of psycho-somatic, breakdown. A man's "captaincy of his soul" has a scientific and clinical relevance in the psychic problems of modern warfare even greater than in the unseen and but partly "conscious" battle with the "slings and arrows of outrageous fortune" in the peaceful struggle for existence.

Hence, as will be indicated later in this chapter, the importance of training, discipline and purposefully ordered habituation. And hence the greater virtue of positive efforts for *promotion of moral health*, rather than the negative effort for the *prevention and treatment of psychotic disorder*.

It would be of the greatest interest to know whether the

he sees things hidden from the patient himself. The things he sees are what constitute the 'psychopathic unconscious'. He discovers much more than what is directly perceptible. . . . He sees the psychosis as the culmination of a series of events and processes, recent and remote, individual and racial, that have left indelible impressions upon the organism. Briefly stated, it becomes evident to him that the psychosis can only be interpreted and understood as a historical process . . .

"Thus to the psychiatrist the 'unconscious' is, . . . not an entity, and not a point of view. It is the primary quality of a collection of facts, gathered together by objective methods of investigation . . . For the psychiatrist the 'unconscious' includes all the morbid processes and changes revealed by objective methods of study, whether these be biochemical, histological, or psychological."

Peloponnesian and Punic Wars, or the Crusades, the Thirty Years War, or even the campaigns of Marlborough, Wellington,⁶ and Napoleon, were associated with an experience in any way comparable with the episode of "shell-shock" in 1914-18, and its post-war reflection in the less dramatic but even more remarkable experiences of the neuroses of the aftermath.

**Historical
retrospect**

But scientific medicine has little to say good or bad on the matter of "medical" disorders of the mind, in peace or war, until a period which is contained well within the past century; to understand the situation into which the medical service was plunged in this war it is necessary to emphasise how very modern the present science of psychology is.

**Medical
discovery
of "mind"**

It is true that Ancient Greece initiated movement in the same direction. The concept of the brain as the central organ of mind dates back at least to Pythagoras (*circa.* 582-500 B.C.). Aristotle (384-322 B.C.) brought the attributes of mind within the field of objective rational enquiry. The medical school of Cos concerned itself with the maintenance of mental and physical balance rather than with the discrimination of specific aberrations from the norm of health. To Hippocrates, mind and body reacted as a single unit of organic life. But thereafter, rational medicine abandoned the soul to the priest and the metaphysician, and set itself to discover the phenomenal attributes of the nervous system. It is to Galen, "the first experimental neurologist", that we trace the effective severance of physiological from mental phenomena. He experimented with animals, and mind may not be discerned through anatomy and physiology.⁷ Thereafter to the psychologist in the "Dark" and "Middle" Ages mind was soul and the soul belonged not to man but to God or the Devil.

It was the peculiar disservice of Descartes (1596-1650) to the progress of humankind in the intellectual sphere that at

⁶ Sir Andrew Macphail, the erudite author of the Canadian Medical History of the War, speaking of "the term—Shell-shock . . ." says "the condition was well known to the Duke of Wellington and he had a routine method of treatment".

⁷ Sir Thomas Browne (1605-82) having dissected large numbers of human brains and failing to discover an authentic seat for the soul decided that it did not reside there. Descartes conceived the human body as a material machine directed by a rational soul located in the pineal gland at the base of the brain. According to Garrison (*An Introduction to the History of Medicine*, p. 258). Descartes first described "reflex action", the basis of "behaviourism" (*cf.* Mott's investigations on "shell-shock" described later in this chapter).

that stage of the Renaissance, so hopeful and fruitful in other branches of science and free thought, he created for metaphysics and psychology a profound system on the sterile base of deductive logic buttressed on the shifting sands of unconfirmed hypothesis. It was his tragic and disastrous bequest to man's cultural progress that he carried into the intellectual sphere, as between "mind" and body, the discrimination which in the "spiritual" sphere—as between "soul" and body—had come to be accepted as a postulate of Christian dogmatics. Between man and the other animals (by this hypothesis) is a gulf fixed—a separation not merely of degree but of essential nature and being. By the teaching of Holy Church, on pain of impiety, the "likeness of God" was held to place the impulses and emotions which motivated the soulless animal world outside the sphere of comparison with those which operated in man. Descartes applied this to the motives and mechanism of the mind.

The effects of this mode of thought were twofold. First, that the study of the ordered and the disordered mind was placed "out of bounds" for scientific medicine, and psychology became the happy hunting ground of metaphysical speculation. The second was one of the most terrible in the history of medicine. The existing Christian doctrine of "possession" by the Devil was firmly fixed as a theory of pathogenesis applicable to disorders of the mind. Not only the more bizarre and unpleasant manifestations of the insane mind—the manic-depressive syndrome, the delusional insanities, mental deficiency—but the protean manifestations of hysteria—as the "Devil's claw" (anaesthetic patch), and the manifold phenomena of "mass suggestion"—were drawn in to reinforce this dreadful diagnosis of "possession" and "witchcraft".

But *pari passu* the right to think, to experiment, and to draw rational conclusions therefrom had been won; and it fell chiefly to Englishmen—Bacon, Harvey, Gilbert, Boyle,⁸

⁸ It may be recalled that besides being the creator of scientific chemistry, Robert Boyle was the first to declare that the reflex phenomena seen in decerebrate animals were entirely material and mechanical. In 1811 the English surgeon Sir Charles Bell exposed by animal experiment its precise mechanism, in the "afferent" nerves. And it was just before the Great War that the Russian physiologist Pavlov laid bare the extraordinary phenomenon of the "conditioned reflex", and thereby established the foundation for the "behaviouristic" psychology of J. B. Watson and (a matter of real importance) for a scientific integration of psychology and psychiatry with physiology and neurology.

Newton—to exploit this freedom, and to create the structure of modern science, based on the inductive method of logic. And it was this same insight and courage that led yet another Englishman, Charles Darwin, to prove to a world hardly less tied and bound by authority that, while man may be made in the image of God, his mind and emotions not less than his physical form reflect also the long trail that leads up from the beasts that perish.

It is not necessary here to follow in detail the gradual encroachment of medicine on to the domain of the mind. With the unfortunate identification of “mind” with “soul”, and the dissociation of both from the laws of physical life, the problem of cerebral functioning, both physiological and psychic, and of the disorders of these, had diverged along three lines. *The Church* had retained so much of the “soul” as could be saved from the Devil, the remainder being handed over to hell-fire or to bonfires; the study of *mind* went to the metaphysicians, and such art as was concerned with it became the field of the quack—whose rich harvest from that source even yet scarcely shows signs of diminution. Scientific medicine had to toil up the long and difficult road that led first to an understanding of “the wisdom of the body”, and when this had been mastered, to enter, with the new freedom gained for scientific thought by Charles Darwin, upon the conquest of the mystery of mind and of its disorders. For that task, however, it was at last equipped with a full mastery of the “scientific” technique.

None of the broad divisions that to-day comprise moral and mental medicine—criminology, “neurology” and psychiatry⁹—attained to the stage of an applied science and art until within the memory of men who had part in the Great War.¹⁰

For the medical profession and for medical history, both civil and military, the evolution of the concept “crime”, and in particular military crime, is a subject of great interest and importance. Until the modern era “crime” was crime and that was

The evolution of criminology

⁹ Until quite recent years, “psycho-pathology” adhered with neurology, and “psychiatry” connoted the problems of mental alienation alone

¹⁰ Thus Charcot died in 1893, Lombroso in 1909, Mercier in 1919, and Kraepelin in 1927.

all there was to it. But by the middle of the 19th century a few thinkers had so far followed Francis Bacon's advice as to grope toward an *objective* study of human beings in their social relationships.¹¹

Quetelet (1796-1874) exploited the science of statistics and proved that human conduct varies fundamentally in response to environmental conditions. Darwin (1809-1882), Wallace, and Spencer demonstrated the identity of human with animal emotions and passions. Cesare Lombroso (1836-1909), an Italian physician, set out the idea that the criminal is born not made, and postulated a congenital "criminal type". Goring in Britain, in an extensive but imperfectly designed series of investigations, decided that there is no criminal type but that generally defective physique and defective intelligence were the only constant factors ascertainable. The British school headed by Mercier (1852-1919) and Maudsley (1835-1918) developed the idea of a "moral insanity" and postulated an intermediate area between disease and crime. A fundamental scientific advance was made in 1905 when Binet (1857-1911) and Simon developed the now universally employed series of mental tests, and in the "intelligence quotient" gave to social science, and thus to medical psychology, or psychiatry, and to criminology, a "yard stick for measuring intelligence". This was applied in the examination of recruits for the American Expeditionary Force with extraordinary and disconcerting results (to which reference is made later) and which led both to a reorientation of the social outlook and to a revision of the tests.¹²

The cardinal event in the modern history of psychiatry is the inspiration (derived from thought and work of many pioneers) that led Sigmund Freud (1856-1939) to create a pseudo-scientific field of research into the nature of mental syndromes by the device of identifying with *phenomena* certain concepts derived from exact observation and analysis of mental behaviour. Such concepts—for example those of the unconscious mind, the libido, and the process of sublimation—

**The evolution
of modern
"psychiatry"**

¹¹ See Prof. A. Morris, *Criminology* (Longmans Green: 1934).

¹² As will later be seen the line of approach taken by the Australian Government in the problem of elimination of "moral and mental" unfits was entirely different. See Chap. xv.

were then used by him as the facts for an inductive inquiry into the nature of mental disorder and incidentally of mind itself. The importance of this achievement to the subject of the present chapter is not diminished by the fact that neither the Freudian system of treatment—psycho-analysis—published in 1909, nor any of its variants, was *deliberately* applied on any significant scale by either side during the war; or by the fact that the problem had been approached on other lines by men whose contribution to the *corpus* of knowledge concerning the functions of the brain as the organ of mind surpassed in importance those of Freud himself or of his disciples.

With this beacon in view we must now briefly review these other lines of approach with which, in the account of the actual events of the war, we shall be more directly concerned. Those approaches were through *neurology*, through *psychology*, and through the study of *insanity*.

Both Willis (1621-75), anatomist and neurologist and Sydenham (1624-89) a pure clinician, wrote on hysteria. But thereafter neurology evolves along more and more clearly defined lines, its objective the elucidation of cerebral and neural functioning, normal and abnormal. Through the 17th, 18th and 19th centuries a stately line of physicians and, in later years, of surgeons, with British medicine well represented, worked out, first, the place of the brain, spinal cord and nerves in the hierarchy of the somatic systems; next, its internal structure, mode of functioning, and diseases. One by one through the centuries the mysterious and bizarre morbid syndromes that are the outward sign of neural injury or degeneration were identified and brought within a nosological scheme that became the most extensive in systemic medicine. This nomenclature was based strictly on anatomical, physiological and pathological concepts.

"*Functional*" *nervous disorders*. But it included also a group of disorders which, because they had no demonstrable basis of pathological anatomy, were termed "functional". The group included a variety of ill-defined syndromes—such as "hysteria", "neurasthenia", "hypochondria"—whose names betray their highly fanciful attributions. Professionally they lay in a vague no-man's land between neurology and general

medicine. They are with us to-day in text-books which are by no means out-of-date, and the official moral and mental medicine of the war was based on these concepts. And, as broad syndromes vaguely distinguishing two groups of clinical phenomena—the various types of “hysteria”, and of morbid “anxiety-state” (both of which are indicative of disordered “functioning”) they were of some administrative, if not of any special therapeutic service in the war.

As will later be clearly seen, in the matter of strictly mental disorder neurology and the neurologists in a measure failed the profession and the army in this crisis of 1914-18; and the reason for this is definite and now well recognised—that in their study of “functional” disorder they had been content to stage a Hamlet without the Prince. The phenomena of “mind” had not been discerned as the chief element in this “functioning”. Physiology and the physiological outlook dominated aetiology, diagnosis, and therapy. Neurologists sought not less earnestly than did Sir Thomas Browne to identify the mind among the brain-cells and neurons, and as Professor R. J. A. Berry¹³ has very well said “if the ideas are not in the brain-cells, where are they?” In this research the British school of neurology had led the way. Yet in 1933 Professor Sir C. S. Sherrington, one of the very great men in neurology, after a life-time spent in research aimed at the integrating of mind and brain, confessed that the search had led to little more than a vague concept of synaptic inhibition.¹⁴

Speculations . . . can have no root for want of intelligible link between nerve-process and mind-process. Pragmatic commonsense may disregard that difficulty; but analytically we cannot disregard the starting point for all analysis. . . . We have to regard the relation of mind to brain as still not merely unsolved but still devoid of a basis for its very beginning.¹⁵

¹³ Late Professor of Anatomy, University of Melbourne, and Director of Medical Services, Stoke Park Colony, Stapleton, Bristol. (*Brain and Mind* See review in *British Medical Journal*, 29 Sept. 1928, p. 571.)

¹⁴ *The Brain and its Mechanism*, by Sir Charles Sherrington, F.R.S., Waynflete Professor of Physiology in the University of Oxford. (The Rede Lecture delivered before the University of Cambridge, 5 Dec. 1933, p. 32).

¹⁵ That a physiological-psychological integration is the final aim of both neurology and psychology is expressly asserted by Sigmund Freud himself:

“The edifice of psycho-analytic doctrine which we have erected is in reality but a superstructure which will have to be set on its organic foundation at some time or other; but this foundation is still unknown to us.” (*Introductory Lectures on Psychoanalysis*, 1922, quoted by Prof. W. S. Dawson in “Psychiatry and Medicine”, *Medical Journal of Australia*, 25 Apr. 1931)

But to prove that preoccupation in neurology did not preclude original and creative insight into psychiatric problems it is only necessary to instance the well known conception by Hughlings Jackson (1834-1911) of the *dissolution of functional levels in nervous diseases* and the application of this to the question of the nature of insanity.¹⁶ Moreover, it was in 1916 that Mr. Wilfred Trotter published his *Instincts of the Herd in Peace and War*.

And medicine owes to neurology two other developments that had a profound importance in connection with the psychic medicine of the war of 1914-18.

The somatic (visceral) neuroses and the autonomic nervous system. Military interest in the visceral neuroses begins with the historic account of the incidence of "the soldiers' heart" in the American Civil War by Da Costa. The scientific history of this condition is part and parcel with that of the *autonomic nervous system* and the "*internal secretions*" and runs in close parallel as do those physiological factors themselves in their relevance to mental disorder. At the end of the 19th century the concept of the "visceral neuroses" proposed by Clifford Allbutt was being assimilated to neurology.

The traumatic neuroses, "railway spine". The second development is contained in the birth of a theory of psychopathogeny (as we may now denominate it), of which Professor Millais Culpin¹⁷ has affirmed that if it had been followed up with the vigour it deserved it might have changed the history of neuro-psychiatry and of the medicine of the war. This was postulated, first in 1891 by Mr. Herbert Page of St. Mary's Hospital, London¹⁸ as "traumatic neurosis" as an explanation

¹⁶ Prof. W. S. Dawson (*loc cit*), relates this concept to views put forward in 1881 by the asylum physician Henry Munro, to whom he attributes "the foundations of modern psychiatry". Jackson (Prof. Dawson contends) "stressed four factors in the causation of the insanities" to which "we may still look as the 'law and the prophets' in the aetiology and symptomatology of mental disorders". Prof. Dawson cites these in up-to-date terms as follows: "(i) the degree of failure of adaptation or of regression to more primitive, inferior functional levels (dissolution); (ii) the personality of the patient, his inherited and acquired psycho-physical dispositions; (iii) the rapidity with which the dissolution occurs, and (iv) the influence of the vegetative mechanisms of the body and of the environment upon the nervous system."

Shortly before the war of 1914-18 these principles were reasserted by Sir Henry Head in his monumental work on aphasia.

¹⁷ Professor of Medical-Industrial Psychology, University of London

¹⁸ Prof. Hermann Oppenheim of Berlin published his important treatise on the traumatic neuroses in 1889.

of "railway spine", a term applied to certain mysterious symptoms following on the "shock" of railway accidents, in particular those wherein the question of compensation arose. Page claimed that these symptoms were chiefly or sometimes wholly "mental" in origin. He compelled a grudging acceptance to his views, but there, chiefly for lack of material, the matter rested—until the "shell"-shocks of the Great War.

"Railway spine" stands to "shell-shock" in much the same relation as the "effort syndrome" to the "soldier's heart" inasmuch as, with a dominant pathogenic element of *psyche*, each has close relations with the *soma*.

But with all this it may be stated that, in a general way, the war of 1914-18 began with neurologists thinking along physiological rather than psychological lines, and with a definite clinical and philosophic gap apparent between the specialties of *neurology* and *psychiatry*.

The abstract science (as it may be called) of modern "psychiatry" includes the study and practice in the "neuroses" and the "psychoses" or "major" psychoses. It has derived along three lines of research—the study of normal psychology—the "mental" counterpart of physiology; the study of morbid psychology (psycho-pathology); and the study of the alienated mind, that is, of insanity ("psychiatry" in its original sense). For convenience we have assigned to the last a special place in this retrospect and among the conduct disorders of the war.

(a) *Normal psychology*. The study of the psyche (as it must now be termed) had moved along three lines, which may be defined as the *introspective*, the *experimental*, and the *comparative* or *biological*.

(i) *Introspection*. "Until comparatively recent times," says Devine,¹⁹ "the academic psychologist concerned himself mainly with introspective studies of the content of consciousness—images, perceptions, and feelings—and interested himself but little in the hidden sources of action." It was upon this method that neurologists before the First World War chiefly relied for the approach to the problem of the link between brain

¹⁹ *Recent Advances in Psychiatry*, p. 261.

and mind—or between neurology and metaphysics. Since then it has been generally discarded in favour of more objective methods—*experimental psychology*, *comparative psychology* and *morbid psychology*.

(ii) *Experiment*. Experimental psychology began in 1846 in E. H. Weber's laboratory in Leipzig. He was the first to show that common sensation can be analysed into visceral and muscular components, and that these can be separated from tactile sensations. The rudiments of analytic psychology can be traced in his studies of "pathologic lying" and of infantile behaviour. The discrimination of epicritic, protopathic and deep sensibility by Head, Rivers and Sherren (1905-8) are in the same line. But it led to a "bag's end" until in 1900 the great Russian physiologist, Pavlov, discovered the phenomenon of the "conditioned reflex" on which Dr. J. B. Watson, Professor of Psychology at Johns Hopkins University, built his system of "behaviourism", an exposition of which was first published in 1914. Watson's reaction to the search for the *psyche* is to deny its existence. Like that of Freud his teaching did not influence materially the outlook or practice in the war.

(iii) *The biological approach: comparative psychology*. Aristotle has been called the first comparative psychologist. Charles Darwin may well be acclaimed as the first of the modern ones. His *Expression of the emotions in man and animals* (1873) was the forerunner of attempts at the end of the 19th century to define and categorise the primitive motives and mechanisms which lay behind behaviour and conduct in man and animals. In Australia the works of William James, William McDougall, and Jacques Loeb largely moulded the "psychological" outlook of the wartime generation of medical practitioners. The comparative line of approach was also followed by Professor W. H. R. Rivers.²⁰

(b) *Morbid psychology: Janet, Charcot, Freud*. But the most useful knowledge hitherto attained concerning the mind had come from study of *its disorders*. The most important studies of the minor types of mental disorder are those which

²⁰ The post-war studies of Profs. Wood Jones and Porteus in their *Matrix of the Mind* prove that this method is no more outmoded than are the fundamental principles of evolution itself (Wood Jones was sometime Professor of Anatomy in the Universities of London, Adelaide, and Melbourne; and S. D. Porteus lecturer on Experimental Education, University of Melbourne.)

derived directly or indirectly from the French school of neurologists and psychiatrists in the last part of the 19th century. The pioneer work of Janet and of Charcot on hysteria, and of the Nancy school (1880-90), was the direct inspiration of Freud, and so of Jung, Adler and the whole of the *psycho-analytic school*.²¹

And so the track of research comes up to that beacon light to which reference was made above. Despite the modern belief in the method of "mass approach" in scientific investigation, the world owes the two greatest discoveries in psycho-pathogeny to studies that were concentrated on two individual minds—those of "Irene" and "Dora". By contemplation of the conduct of "Irene", Janet in 1907 conceived the concept of *mental dissociation*. Exploitation of this concept in the mental exploration of "Dora" by the method of "psycho-analysis" led Freud and Breuer to formulate the concept of "the unconscious" domain of the mind and of its "censor" as a means of access to the mysteries of the levels of mental and vital activity below the plane of pallial consciousness as formulated by Hughlings Jackson; and to work out the technique for a new approach to the "mystery" of the mind by "psycho-analysis".

(c) *The alienated mind: insanity*. The terrible past history of the treatment of the sickness comprised under the "major psychoses" must be understood if the admirable record of Australia in the repatriation of "mentals" is to be appreciated, and lessons of immediate and permanent value drawn from it.

In the classic era of Greece the attitude toward the insane was eminently "sane".

To Hippocrates must be ascribed the honour of being the first to establish insanity and epilepsy as natural diseases due to disorders of the brain, and requiring the skill of physicians rather than that of priests.²²

Following Hippocrates, Asclepiades was a pioneer in the

²¹ It should be recalled that these in themselves, and also the modern system of treatment by hypnotism and suggestion, emerged from the work of Mesmer (1734-1815) and the explorations in that field by the Anglo-Indian Esdaile (1808-59), who in 1845 amputated limbs under hypnotism, and of James Braid (1795-1861).

In much the same way the science of cranial topography was founded on the pioneer work of the "phrenologists" Gall and Spurzheim.

²² *Mental Diseases*. A text-book of Psychiatry for Medical Students and Practitioners by R. H. Cole, M.D. (Lond.), F.R.C.P., p. 6 (London. University of London Press Ltd., 2nd Edn., 1919)

humane treatment of mental disorders, and employed occupation therapy, exercises in promoting memory and fixing attention, and music and wine to promote sleep.²³ But with the superstition that blighted thought throughout the Middle Ages we enter upon one of the most terrible chapters not only of medicine but of mankind. Save for a few enlightened minds, "possession" by the Devil replaced the idea of disordered brain. In the 17th century Thomas Willis (1621-1675) and after him Morgagni (1682-1771) sought to revive the doctrine of the close relation between mind and the brain, but they were as voices speaking in a wilderness of superstition and theology; and after them there came a period barren of both science and humanity.²⁴

The revolt by science and humanity against fear and fetish dates from the end of the 18th century, when Pinel, first of the clinical alienists, backed by the new free-thought of France "struck off the chains from insane patients at the Bicêtre". Though his classification of insanity is now obsolete, it opened the way to a progressive application of the scientific method. This culminated in the great work of Esquirol (1838), and led through the Tukes in Britain to Emil Kraepelin (1856-1927). Kraepelin, the pioneer of experimental psychiatry, created the first scientific "system" of mental disease. With him we abut on modern psychiatry as applied to the study of the disordered mind, which was its original concern.

This humane and scientific advance was in progress when the First World War broke out. But superstition and fetish die hard. One of the major medical problems of recruiting was the universal suppression of a "tainted" family history, and it is probable that this attitude was partly due to the outlook of the medical profession itself. It is not long since the *mental* element in mental disease and disorder was the least understood and the least studied of all the pathogenic factors concerned. Up to the outbreak of the war psychiatry had found itself very fully occupied in the discrimination of clinical syndromes by the observation of behaviour, while neurology was concerned with the endeavour to relate these with

²³ Garrison, *loc cit*, p. 106

²⁴ The philosopher Kant maintained that insanity was the province not of the physician but of the philosopher. *Ibid*, p. 401.

anatomical or physiological degradation or disorder. "Delusional" and "adolescent" insanity had been analysed, and the concepts "paranoia", "dementia praecox", and even the schizophrenic state, had been discriminated. The association of specific cerebral degeneration with certain forms or stages of these various syndromes had been observed; a causal relation between syphilis and general paralysis had been proved by the Wassermann test. Psychiatry and neurology were collaborating closely enough to produce a *Journal of Neurology and Psychiatry*, under the editorship of Frederick Mott; and many famous names prove the existence at that time of this connection.

Within the psychiatric specialty itself "the motives and mechanisms of the mind" were being given the attention they deserved. The first edition of Hart's *Psychology of Insanity*, in which the work of Janet, Freud, Jung, and McDougall has chief place, was published in 1912. In a favoured work on *Mental Diseases* (by R. H. Cole), published in 1913, "the latest developments in the Psychology and Pathology of Insanity" received "attention". "Hysteria", "neurasthenia", and "psychasthenia" (obsession) were described, chiefly in their relation to insanity.

Nevertheless the most important historical fact relating to the mental medicine of the First World War is that, speaking broadly, the study of "mind" was in 1914 philosophic and introspective rather than scientific; the medicine of the minor forms of mentally disordered conduct was not regarded as a matter worthy the serious attention of the scientific physician, neurologist, or psychiatrist. In practice "functional" disorders (i.e. those of conduct) were relegated to the general physician—with effective reversion to the quack!

To summarise—at the outbreak of the war the medical profession expected, and was fully equipped to meet, the problems of war surgery in the specialty of neurology, that is, the science relating to the diseases and injuries of the central nervous system. The topography of the brain was well advanced wanting only (as Professors Wood Jones and Porteus have observed)²⁵ the opportunity for verification on human

**Summary:
situation in
1914**

²⁵ *Matrix of the Mind*, p. 82

subjects. Surgical giants such as Harvey Cushing, Sir Victor Horsley and Sir Percy Sargent were its exponents in the war.

In the clinical study of *insanity* and in the principles applied in its treatment the standards were not greatly inferior to those obtaining in other branches of scientific medicine. Nevertheless, in spite of a vigorous and growing movement towards a study of the "mental" component, the outlook of the profession was still predominantly behaviouristic and material.

In the matter of those disorders of conduct which, as the "*psycho-neuroses*", became one of the chief problems of medicine in the war—and the one with which this chapter is almost wholly concerned, the situation of current medical practice and teaching has been summed up with authority as follows:

Though the Russo-Japanese war might have led physicians to expect psycho-neurosis on an extensive scale, the medical administration of our own and other armies was wholly unprepared for the vast extent and varied forms in which modern warfare is able to upset the higher functions of the nervous system and the mental activity of those called upon to take part in it. Moreover, before the war, the psycho-neuroses had interested few practitioners of medicine. Common as these disorders are in civil life, they are left almost without notice in medical education, while those who had paid special attention to the subject were torn asunder by fierce differences of opinion, not only concerning the nature of these disturbances of nervous and mental function, but also in regard to the practical measures by which they might be treated or prevented. The outbreak of the war found the medical profession with no such common body of principles and measures as those which enabled Medicine and Surgery to deal so successfully with the more material effects of warfare upon the human organism.²⁶

THE SITUATION IN AUSTRALIA 1914

The situation in Australia did not differ materially from that in the most highly cultured nations of the Eastern and Western world. In social matters, however, this nation possessed a particular outlook, the effect of which was strongly seen in the attitude towards both civil and military law and the treatment of "offenders". It is true that "law and order" was recognised as the foundation of society as firmly and jealously as in Great Britain and throughout the British Commonwealth. The "liberty of the subject", trial by jury,

**The social
outlook:
military crime**

²⁶ From Introduction to *Instinct and the Unconscious* by W. H. R. Rivers, F.R.S., Fellow and Praelector in Natural Sciences, St John's College, Cambridge, p. 2 (Cambridge At the University Press, 1920).

and a judiciary independent of political influence are the foundation of the Australian legal system as Christian principles are of the ethical.

There was, however, a definite though subtle difference between the Australian outlook and that of, at least, the governing classes in Great Britain. The social injustices of the early history of Australia had bitten deeply into the national feelings and tradition, and subsequent history had not tended to lessen this. This was reflected in a demand for a more definitely moral perspective in the adjustment of punishment to crime. With this went a definite leaning towards prevention as against penalty—for constructive as against negative handling of human problems. The Australian system of industrial arbitration—for example—was the most exact attempt hitherto made to adjust relations between capital and labour on scientific and constructive lines. In a word Australia was constructively “democratic”.

This outlook was reflected in the system of Military Law contained in the Commonwealth *Defence Act and Regulations*—the analogue of the British *Army Act and King's Regulations*. It was responsible for the fact that the A.I.F. managed to get through the war without the introduction of a death penalty for most offences so punishable in other armies, and there were many other differences, especially in the application of the law.

In the Australian medical schools the teaching of neurology and psychiatry was in line with that elsewhere; neither had much concern with the “mental” and “psychological” attributions of their specialty. In the State of New South Wales, however, two factors tended to modify this limitation. The first was the teaching and practice of two neurological specialists of quite outstanding ability and insight, Dr. George E. Rennie and Dr. A. W. Campbell.

Campbell was one of the great minds in Australian medicine, and his work is part and parcel with the history of the A.I.F. Of Rennie it is to be said that at a very early date he recognised the value of psycho-therapy in the treatment of nervous and mental disorders, and endeavoured—though without great success—to assimilate the new advances in psycho-path-

**Medicine:
neurology and
psychiatry**

ogeny with the general teaching and practice of medicine in Australia.²⁷

The second factor was the establishment under the enlightened direction of Dr. Eric Sinclair, head of the Lunacy Department of New South Wales, of a special Research Laboratory, situated in the University of Sydney. It was directed by Dr. J. Froude Flashman, with the co-operation of Dr. Oliver Latham, two men with definite qualities of genius. This laboratory was, and has since been, a source of scientific inspiration not only to its Department but to the medical profession of Australia.²⁸

In Victoria two clinicians not less worthy of note, though in less exactly specialised spheres are prominent throughout this history. These were Henry Maudsley and Richard Stawell.

II

THE EXPERIENCE OF THE A I F. 1914-18

Such being, in outline, the development of knowledge and practice in this field of medicine at the time of the First World War, what (we now have to ask) was the experience of the Australian Imperial Force?

In the first place, the "moral and mental", as well as the physical standard of "normality", of the force was unquestionably high. In a great measure the Australian

**Moral and
mental standard
of the A I F.**

Imperial Force selected itself and both internal and external factors in the brief history of the Australian nation favoured the creation of a race of men attuned to a high standard of psychic health. Of the causes that elsewhere have tended to affect the race adversely competitive industrialisation had, until this present century, barely influenced the Australian people. Even the excessive urbanisation²⁹ of which much had been said and

²⁷ Dr. Rennie was for many years Editor of the *Australasian Medical Gazette*. At the Australasian Medical Congress in Auckland, 1914, a paper on "Psycho-Analytic Treatment" was read for Prof. Ernest Jones, of London. (*Transactions, Tenth Session*, pp. 754-9.)

²⁸ For the treatment of the insane in Australia see *Chaps. xv and xvi*.

²⁹ In *Social Psychology* (13th Edn., p. 297) Prof. Wm. McDougall places Australia as the most gross example of the tendency. He failed to observe that at the time this was largely offset by the opportunities afforded by climate, standard of living and so forth.

But there can be no question whatever but that Australia stands to-day in this matter at a crucial parting of ways.

written was very fully counter-balanced by the nearness of the city people to the open country, the prevalence of sport, the—then—comparatively large areas of open space in the cities themselves, and, by no means least, the high wage level.

Social if not economic equality existed and even in the largely urbanised States of New South Wales and Victoria a comparatively large proportion of youths actively participated in sports.

Nothing in the nature of a systematic and deliberate elimination of recruits "morally and mentally" unfit took place in Australian recruiting. The degree of mental fitness is not to be determined without special measures therefor, and certainly nothing was done even remotely approaching the mass-survey, physical and mental, of manhood undertaken by the U.S.A. It is probable indeed that the most effective weeding out of mental unfits from the A.I.F. took place in the camps of training, where temperamental unsuitability for army life is often revealed. Indeed, though the assistance of psychiatrists in recruiting is undoubtedly essential, probably more may be learned by close observation in camps of training than by such mass campaigns of psychic and intellectual analysis as are possible amid the urgencies of a desperate war. And, as will be seen later, the effects of any failure of the recruiting system to eliminate mental unfits were not prominent in the field; when all is said the history of the A.I.F. seems to show that its chief troubles in the "mental" sphere were in general due to other causes.

The proportion of moral and mental causes of rejection or discharge from camps in Australia and the number of men invalided "without service" because of these disorders are shown in the statistical chapter. It is true that when recruiting fell very low General Howse had cause to complain of serious laxness in the acceptance of mentally unfit men.³⁰

³⁰ In a letter of 28 Aug 1917, Lt.-Col. G. S. Miles, R.A.M.C., mental specialist of the British Southern Command, called the attention of the British D.D.M.S. in that area to the fact that he had since April 12 recommended the sending back to Australia of 16 reinforcements whom he regarded as mentally unfit to serve.

"I am of opinion," he added, "that in all these cases had they been carefully inspected previously to embarkation the mental defects should have been detected and the cost of transportation both to Europe and return might have been saved as well as the trouble of attempting to give them military instruction."

Australian records throw little light on the problems presented by the several groups of potential unfits and misfits.

But one of the most definite "lessons" of this war is the importance of the family and personal history in determining moral and mental breakdown in war. Here by far the chief cause of difficulty lay in mis-statement or suppression by the recruits in the matter of personal and family history; and this was almost equally significant in both major psychosis and neurosis, and in epilepsy.³¹

THE GALLIPOLI CAMPAIGN

The medical experiences of the A.I.F. at the front fell into three main periods:

Moral and mental problems (1) The Gallipoli Campaign (1915), (2) The Sinai and Palestine Campaign (1916-18), and (3) The Western Front (1916-18).

In the domain of physical disease medical events differed very greatly in these several theatres by reason chiefly of fundamental differences in the environment.³² This aetiological particularity is much less evident in the domain of mental experience, yet the "moral and mental" history of the Gallipoli Campaign has features which in view of current doctrines are of interest as suggesting—though the evidence does not warrant more than suggestion—that some specific influence was exercised by environment on the incidence of these disorders.

As an experience in psycho-pathogeny the Gallipoli Campaign has this important feature that it was self-contained, and was of a duration and an extent adequate to comprise a complete experience. Unfortunately the records available for study are very defective by reason chiefly of the fact that:

The psychic history of Gallipoli

(a) The campaign belongs to a stage of the war when the idea of a psychiatric problem had simply not entered into the minds of the medical service.

(b) That psychiatric nomenclature reflected with an unpleasant accuracy the confusion that still existed in medical teaching on the subject.

³¹ This peculiarly mean and unpatriotic deception has been condemned not only by the public press but by returned soldiers. When it is clearly deliberate the Government should ensure that appropriate penalty be enforced for this form of perjury.

³² See Vol I, Chaps. xiv, xvi, xvii and Vol. II, Chaps. xviii-xix.

(c) That the system of recording the causes for which soldiers were evacuated and which constituted the raw material for medical statistics was still crude.

To offset these are three facts of interest for the history of the A.I.F.

First that for this first year of the war it is possible to present a complete statement of the causes for which men were evacuated so far as they were recorded in the Admission and Discharge Books of medical units.

Second that general medical events of the campaign have been fully and exactly studied and recorded.³³ In this way nervous diseases and disorders can be observed in their complete aetiological environment.

Third that the diagnosis "D.A.H." being official, exact information is available in Australian records of certain experiences which seem to bear on the military significance, at least, of this syndrome.

Before the force sailed for Gallipoli the medical service was required to co-operate in weeding out a considerable number of men whose services were no longer required or who were "unlikely to prove efficient soldiers",³⁴ who were sent back to Australia.

In discussing the psychic experience of the A.I.F. in Gallipoli, as elsewhere, this narrative will adopt the division already laid down—into delinquent conduct, psycho- and somatic-neuroses, and psychoses—and the same will be done as far as possible in marshalling the relevant figures for each campaign.

Of delinquent conduct (over and above the contraction of venereal disease) two types came into the medical picture of this extraordinary episode—namely *malingering* and *self-wounding*.

Gallipoli:

1. Delinquency

Malingering. The nature of the medical problem involved in this crime was brought home to the Australian Medical Service in this campaign in a peculiarly interesting fashion.

Of conscious and deliberate malingering there was very

³³ As will be seen later, at No. 2 A.G.H. a very exact clinical study of cases which returned to Egypt was made by one of the most eminent of Australia's psychiatrists, Maj. A. W. Campbell.

³⁴ Under these two formulas a large number of men were returned to Australia throughout the war who for various reasons were believed to be unserviceable. Among them were a considerable number who had got into the force by concealing disease, knowing they could compel discharge at any time by disclosing it.

little³⁵—partly perhaps for the good reason that no purpose could be served! Until the end of the campaign, as has been elsewhere recorded, the “stern purpose of Gallipoli” decreed that to qualify for evacuation a soldier must be definitely and obviously unfit to “carry on”. On the other hand medical officers were brought abruptly face to face with the extraordinary moral and mental problems involved in the phenomena of the hysterical syndrome, in particular their relation to the conscious “will”. It is not contended that Regimental Medical Officers apprehended the significance of the tremors, stammerings, mutisms, paralyses and so forth, for which they sent men to the Base. But the problems of psycho-neurosis as presented in the war were observed and recorded in this campaign by Australian medical officers with a grasp of essentials that was hardly exceeded in later years. And this study included in its purview the psychic no-man’s land that separates malingering from hysteria, and which links free-will with determinism.

It is probable that a “moral” condition—not yet “hysteria”—constrained not a few men, whose descent to the limbo of a fully-developed neurosis began with a conscious, or semi-conscious, failure to act as his soldier’s “conscience” dictated that he should. Nevertheless it is the sustainment of stresses, “moral and mental”, quite as much as the demonstration of fighting qualities that so amply justifies the selection of Anzac Day as the Australian national commemoration.³⁶

Self-inflicted wounds. The conditions of Gallipoli precluded in a great measure the relief to unbearable tension afforded to “weaker vessels” by wine, women and “A.W.L.” Nor—except for rare leave in Lemnos and Imbros—were amenities such as rest and recreation provided as a respite from intolerable strain. Such measures as on the Western Front were found by far the most effective prophylaxis to avoidable nervous breakdown were probably impossible on Gallipoli.

This had two results. First, a large evacuation from psychophysical and psycho-somatic breakdown, “debility”, indigestion, and functional disorders. Second, repeated short epidemics of

³⁵ See Vol. I, Chap. xvi.

³⁶ The reader may be commended in this connection to the closing paragraph of the *Australian Official History*, Vol. I, The Landing at Anzac.

self-inflicted wounds. These outbreaks were not so much sophisticated and deliberate attempts to shirk, as a crude and instinctive reaction against a psychic impasse which in less determined and morally-poised men would manifest itself as hysteria—the “flight into disease”. So far as records show, the outbreaks took the form entirely of personal maiming by rifle, or by exposure to enemy fire.

Though not unique this episode is the only important one in the history of the A.I.F.

The records show that from an early stage of the campaign the problem of self-maiming caused concern to the military authorities. Beginning on May 26th special cautions and instructions for dealing with outbreaks are recorded in July, August, September, October and November. As well as conveying a warning of the prevalence of the crime either in particular units or in the division these prescribed the military and medical procedure to be adopted.³⁷

It may be noted that the recorded details of such “epidemics” at once suggest a relation between the occurrence of such injuries and the morale of the units in which they happened. The interest of this observation will be appreciated later in the chapter.

The history of the psycho-neuroses and somatic neuroses of Gallipoli relates to two fields of experience—that of the *R.M.O's and field ambulances at the front*, and that of the *Base Hospitals in Egypt*. Unfortunately little record of the former exists; no special instructions were issued for dealing with the minor mental (or “functional”) disorders, and medical officers faced the “mental”

**Gallipoli:
2. Psycho-
neuroses and
somatic
neuroses**

³⁷ At the end of May 1915 owing to the number of cases of suspected self-mutilation the 1st Australian Division advised all units as to the wording of the charge to be laid for this class of offence. In July one brigadier of the 1st Division issued a special instruction to one of his battalions owing to the number of self-inflicted injuries in that Battalion. In August G.H.Q., M.E.F. ordered the retention of suspected cases of S.I.I. until a court of enquiry had been held. At end of October the G.O.C. 2nd Division stressed the necessity of exhaustive investigation in suspected cases. “During the past month,” he said, “there have been 20 cases of self-inflicted injuries.”

On November 1 the D.A.G., Mediterranean Expeditionary Force issued an order that, owing to the large increase in cases of self-maiming in the force, men convicted or under arrest on such a charge should not be evacuated but medically treated locally until fit for return to duty; if it was imperative to remove the patient he must not be evacuated beyond Mudros. On November 12 a brigadier of the 2nd Division brought to the notice of his battalion commanders the recent increase in the number of cases.

surprises that met them with the ordinary equipment of a general practitioner. The experience of the R.M.O.'s can justly be termed surprise—they were called on to diagnose the condition and decide the disposal of men who, as the result (as it often seemed) of some “shocking” physical experience, were unable to control tremblings, or were “struck” paralytic, blind or speechless; or they were faced with the problem of men who had hitherto deported themselves after the manner of men, but now became unable to face the situation, relapsing into a condition of mental anguish, and impotence. The lack of a scientific chart for steering diagnosis was presently made up for—apparently as the result of a general consensus of soldiers’ feelings rather than through any instruction from the medical directors—by the acceptance of “shock” (or in the later months of the campaign “shell-shock”, a term that certainly came to Gallipoli from France) as a major element in the aetiology of these cases. In any event evacuation was commonly found necessary. But it was observed consciously or instinctively that, here too, the incidence of such “break-down” was in a great measure determined by individual and unit morale. Gallipoli was a highly intense and individualistic school of conduct, and the factors governing this medical situation were found to be identical with those which influenced the fighting qualities of individuals or of units.

This point had been reached when the campaign ended. The A.I.F. was left conscious of the importance of the moral more than of the physical factors in the maintenance of mental and moral balance. It remained for the Western Front to reverse this attitude.

Meanwhile observations of much interest were being made by Australian officers at the Base. It happened that the staff of the Australian General Hospitals included one of the most scientific, broad-minded, and able neurological specialists that the country has produced, Major A. W. Campbell,³⁸ of No. 2 A.G.H. It will be recalled that No. 2 A.G.H. in Cairo received a large proportion of the medical *flotsam and*

³⁸ After his war service Maj Campbell was appointed to the Military Hospital, Randwick—other honorary positions were Consulting Neurologist to the Royal Alexandra Hospital for Children, Coast Hospital, and Department of Repatriation. (From Obituary, *M J A* 1937) He died in Nov 1937.

**Psycho-
neurosis: The
neurological
specialists**

jetsam of Gallipoli among whom were a fair proportion of the cases of "functional" disorder occurring at this time in the A.I.F. On this experience Major Campbell based the most exact, original, and scholarly study of "nervous breakdown" undertaken by Australian clinicians in the war. His observations were embodied in an article published in the *Medical Journal of Australia* on 15th April 1916. With only minor alterations of phraseology, his appreciation of the medical, military and national problems presented by these cases may be read to-day with interest and advantage, and the episode will here be described by giving a *précis* of his article, which also furnishes an illuminating parallel with the neurological history of this year in the B.E.F.

The observations were based on a study of 176 patients out of a total of 7,152 admissions for non-battle casualty—the percentage rate being 2·4. The diagnoses in the hospital records were—Nervous 93, D.A.H. 43, Mental 27, Alcoholism 13. No figures are available which disclose the composition of the "nervous" group.³⁹

During a year of service with No. 2 Australian General Hospital, comprising the time that operations were proceeding at the Dardanelles (he says) it was vividly demonstrated to my fellow-officers and myself that neuroses and psychoses contributed to modern war casualty lists more heavily than we had previously supposed. . . . It was manifest that these conditions among Australian troops were frequent.

He classifies his cases "for convenience" under the following headings—"Neuroses" (distinguishing "neuroses involving the motor apparatus and common sensibility" and those "involving the special senses and the faculty of speech"); "Neurasthenia and other conditions, including 'trench spine'"; and "Psychoses" ("minor", "mental stupor", "insanity"). Traversing his experience with each of these categories, Major Campbell disclosed what may be termed a system of military psychiatry that might well have served as the foundation for Australian policy and practice. Under the first sub-heading (embracing "cases of hemiplegia and other paralyses and pareses, and contractures and spasms, with or without disturbance of common sensibility") he found:

The conditions were often reminiscent of what the civil practitioner

³⁹ It may be noted that of the 7,152 admissions debility accounted for 199, N.A.D. (No Appreciable Disease) 19.

knows so well as resulting from railway and tramway accidents, and would present as much difficulty in diagnosis and treatment; some few cases would have passed as candidates for the "litigious neurosis".

In "two instructive cases of hemiplegia with hemi-anaesthesia the responsible cause was a shell-burst close at hand; one man lost consciousness, the other did not". (A "neuropathic spasm, contracture or paralysis" might be "grafted on a wound".) Of "neuroses affecting the special senses and speech" numerous examples presented themselves:

Almost without exception the subjects were young and obviously neurotic. . . . In most the cause was a severe shock, such as a shell explosion close at hand, lifting them in the air and burying them with debris, and perhaps, but not necessarily, rendering them unconscious.

Cases of speech affection, aphonia, anarthria, mutism, or stammering, were most frequent.

Though the duration of the disability varied, perfect recovery as regards the proximal affection was the rule. All the recognised tactics of approach to these cases seem to have been employed.

Commonly, after allowing them a day or two in which to settle down, we would suggest that at our next visit they would be able to whisper; the suggestion usually took effect, and ordinary speech soon followed. The kink in the mechanism was occasionally undone by a sudden and unexpected surprise.⁴⁰

Of the "blindness" due to psychic shock (and inaptly called "shell blindness") he records a case—a man who had been "struck blind" within a few minutes of the landing at Anzac. He "made a rapid recovery and returned to the front, where the first exploding shell brought a recurrence of the affection".

The usual congeries of inhibitions and exhibitions was met with.

The immediate causal factor in all was alike; emotional shock contributed to in varying measure by physical fatigue and mental strain.

In treatment *suggestion* was the chief instrumentality.

In this group appear the cases that obviously correspond with the "anxiety neuroses" of to-day.
Psychoses Under "minor" conditions he classified a considerable group of

⁴⁰ Compare Hughlings Jackson's well known story of the jibbing bus-horse, which refused to budge under punishment or cajolery, but started off automatically when the conductor banged the door, the usual prelude to starting.

men unable to withstand fire. These were not necessarily wanting in courage, many of them possibly self-goaded continued on duty for weeks before parading sick. Some were finally knocked out, but not wounded, by an explosion of some kind. . . . Such cases would be admitted with various benign diagnoses, "mental or nervous shock or strain", "shell-shock", "stupor", "loss of memory", etc., and on admission the patients might appear to be in normal health. Further observation however always showed signs of psychic disturbance, such as a restless nervous demeanour, easy excitation, insomnia and disturbing dreams. Those acquainted with and willing to give their family history might reveal a psychopathic tendency. Others might refer their failing to an incident of boyhood. . . . Others again had the seeds of their collapse sown during the period of training.

All these men could give a harrowing account of their mental suffering with a paralysing effect of battle incidents. Their statements were instructive in showing that the fundamental process was one of psychic shock, exhibited by a temporary paralysis of action, or a confusional fugue, or transitory obsessions and fears. . . . In this state an officer would be as incapable of giving orders as a man would be of obeying them.

To these might be added the group of men given to psychasthenia, hypochondriasis, and introspection. . . . Such cases swelled the admission list and were a source of trouble to medical boards. Commonly they were credited with malingering, perhaps unjustly, because the inherent psychopathic basis was the true cause. Be this as it may, from the service point of view they were a useless load.

Cases of mental stupor, or acute dementia of all degrees were admitted and recovered in the restful environment and with the "attentive nursing and abundant diet of hospital life".

Neurasthenia, etc. Of the syndrome related to the group of disabilities comprised in neurasthenia and such conditions as "trench spine" no very clear idea can be drawn from Major Campbell's study. He says:

Among other neuroses brought out by the strain of firing-line conditions we observed various degrees of what is denominated neurasthenia, but this was not so frequent as we anticipated. Prolongation of the strain, however, may add to the number.

He describes a case of hemichorea "the outcome of trench fighting"

with movements of face, trunk and limbs on one side so violent that the subject was unable to walk, use a bed-pan or take food unassisted; his speech also was jerky.

This patient, and as well his mother and sister, had suffered in a similar way before the war. Another "remarkable case" was one of "acute and most severe exophthalmic goitre developing almost immediately after a period of unconsciousness due

to a shell explosion". He had also "coarse tremor of the hands, incoordination of the arms, tremor of the tongue, ataxic speech and profound cardiac arrhythmia, causing critical fainting attacks".

As to the cause of the neuroses, Major Campbell says:

They commonly followed on periods of unconsciousness, or on emotional shock, and phases of intervening meditation, and the effects of physical fatigue and mental strain have been alluded to, but, as a causal factor standing over and above all these, we wish to emphasise the importance of predisposition. Time after time, on going into the family and personal histories of such cases, we found evidence of neuropathic or psychopathic infirmity, and this was the fundamental cause of their downfall.

This is not to say that they had not, at the front, been capable of fighting service of the highest quality. It will be seen later that records from some British units on the Western Front showed that men admitted for "nervous breakdown" had won as large a proportion of "honours and rewards" as the general body of soldiers. But Major Campbell makes it clear, and his views are borne out by the general experience, that men of this kind *who reached the Base Hospitals* were useless for further *fighting* service.

Recovery from the proximal and immediate disability could be expected, and many subjects later might prove useful and efficient on lines of communication, or at a base depot; but, as regards further fighting, all, with one stroke of the pen, might be crossed out as "permanently unfit", and, in doing this, a pang of regret would be felt that their primal weakness was such as to defy detection prior to enlistment.

As to treatment he states that this,

as in all ideo-obsessive states, called for care and judgment. To gain the confidence of the patient and place him under tactful nurses were essential preliminaries, prior to attack with all the psycho-therapeutic measures under command.⁴¹ . . . Without being malingerers, these men generally exaggerated their disability, and, as carriers of psychic contagion were a source of danger in a ward; therefore we always endeavoured as far as possible to isolate them. From each other they received no sympathy.

Major Campbell's final summary deserves the closest attention of all concerned with the future of the Returned Soldier, as a soldier, a man, and a citizen:

⁴¹ He adds, "For affections of the motor apparatus, massage proved very useful."

It should be recognised that to save resistive cases from acquiring the invalid habit, the shorter their stay in hospital and the sooner they resume civilian garb the better. Also, it cannot be too plainly indicated regarding men who have to be returned to Australia that stringent measures should be formulated and forewarnings given for dealing with them on the transport, and on disembarkation and prior to discharge. This is a continuous critical period, during which they must be guarded with the utmost tact and circumspection against themselves and their friends and a grateful country.

The clinical condition which later in the war was officially known as "The Effort Syndrome", was in 1915 still known under the official designation (introduced some years before the war) of "Disordered Action of the Heart". The history of this important form of mental sickness is examined later but there must here be recorded certain experiences in Gallipoli that seem to illuminate to some extent the question of its aetiology.

During the nine months of the campaign 287 cases diagnosed "D.A.H." were evacuated from Gallipoli, a rate of 13.2 per thousand per annum of mean "ration" strength.⁴² The only comparable figure for the Western Front is that of the rate per thousand per annum (of mean "ration" strength) of admissions to the *Expeditionary Base Hospitals*, which was 8.6.

This striking difference might of course be accounted for in various ways,⁴³ the most obvious being different practice in diagnosis and recording. But there is another explanation which, though it also has elements of uncertainty, cannot but be regarded as worthy of note. In the study made of sickness on Gallipoli in *Volume I* an account was given of observations of great interest made by Colonel Sir J. Purves-Stewart on men in the front-line trenches at Anzac in September. Confining his attention to troops "not reported sick" but actually in the firing trenches he found that 77 per cent. were emaciated and anaemic.

"Most striking of all" was the rapidity and feebleness of the heart's action. Tachycardia "not due to sudden exertion or emotion" was

⁴² A total of 287 out of 63,932 evacuations for non-battle casualties. This represents a proportion of 0.45 per cent. The corresponding figure for the B.E.F. cannot accurately be ascertained. On account of the different methods of recording the appropriate comparison (with the admissions to British field ambulances, namely, 0.572 per cent.) cannot be made. It should however be noted that calculated on the admissions to hospitals in the United Kingdom the proportion for the Western Front was 1.55 per cent.

⁴³ Maj. Campbell gives no help here as he does not consider D.A.H. in his report.

found in 50 per cent., and 74 per cent. suffered from shortness of breath.⁴⁴

It was suggested in the *Australian Official History* (as it was certainly accepted at the time by Colonel Stewart and by the medical staff at Anzac) that the condition found was brought about by the conditions of life on Gallipoli. In particular, besides debilitating disease, the nature of the diet (which was proved to be greatly deficient in the "B" and "C" vitamins) and the prolonged and gross hardship and overwork and loss of sleep were held to be adequate to account for the symptoms.⁴⁵

The factor of *nervous strain* however was only less striking than those noted above; and must be presumed to be held to justify the claim made in a recent writing that very many of the cases evacuated from Gallipoli for "heart trouble" were in fact suffering from the "effort syndrome".⁴⁶

But, when all is said, while acknowledging that many of the factors necessary for an exact interpretation are lacking, it seems difficult to escape the conclusion that the physical factors on Gallipoli, or at least the environment, were as much a "cause" of "D.A.H." there as the neurotic predisposition postulated to-day by psychiatrists.

With regard to insanity, information as to the Gallipoli Campaign again comes mainly from Major Campbell. Cases "humanely indicated by the non-committal designation 'nerve-strain'" were admitted to
Gallipoli:
3. Psychoses No. 2 A.G.H. in Egypt in small numbers.

We received the impression, contrary to expectation, that attacks of definite insanity were little if at all more frequent among our troops than they would be in a similar body of men under peace conditions.

While delirium, delusions and hallucinations had "a war colouring", taken as a whole the types of insanity did not differ from those seen in civil practice, and forced the conclusion that active service produced no special nosological disorder of mind.

⁴⁴ Quoted from *Vol. I, p. 352* The statement is taken from the report of the Advisory Committee, M.E.F.

⁴⁵ It is perhaps hardly necessary to recall that a characteristic symptom of "vitamin 'B'" deficiency is weakness of the heart's action. It was recorded by General Howse that "men frequently faint at their post".

⁴⁶ The source of the statement cannot be verified exactly, but was probably an article in the *British Medical Journal*. It is probably generally accepted by most—if not, nowadays, by all—psychological experts.

It was not till the end of this campaign that it was found necessary to make special arrangements in Egypt for the disposal of the cases of "notifiable" mental disorder. In November the D.M.S. there (Surgeon-General R. W. Ford) issued the following instruction:

A "Military Mental Hospital" has been established in the house of the Sub-director of the Hospital for the Insane at Abbassia and will be ready to receive cases from this date inclusive. Accommodation will be available for 20 patients.

In future, British, Australian, and New Zealand soldiers developing mental symptoms and requiring treatment in a mental ward, may be sent to hospital *without certification*. Cases of delirium tremens should not be sent. Indian soldiers who become insane, will be sent *after due certification*, to the Hospital for the Insane as heretofore. . . .

Statistics for Gallipoli The statistics for the Gallipoli Campaign are as follows:⁴⁷

Admissions of A.I.F. soldiers to Mediterranean Expeditionary Force hospital during the year 1915.⁴⁸

Nature of sickness	Admission and Discharge Book entries	No. of cases	Percentage of total sickness
1. Delinquent Conduct ⁴⁹		126	0·19
2. Neuroses (Psycho-neuroses and somatic neuroses).	"Traumatic neurasthenia, shock and shell-shock" ..	576	0·90
	"Neurasthenic hysteria, mental instability, hysterical joint" [sic]	510	0·79
	"Disordered action of the heart" (D.A.H.)	287	0·45
3 Psychoses ⁵⁰		141	0·22

⁴⁷ The test of a clinical nosology is the pragmatic. Does it serve its purpose and contain all the facts relevant to the particular experiences? There are of course "boundary" disputes on borderline cases, but these may serve to remind the clinician that each "individual" functions as an organic whole, and not as a congeries of "normal" or "abnormal" organs and systems. A caveat must be entered against accepting the misleading etymology still endured by the scientific psychologists. The writer feels that, with these warnings, the division here accepted may be sufficient for the present purpose.

⁴⁸ The figures are from the analysis made by the Medical Research Committee of the figures for the Gallipoli Campaign. (See statement *Chap. xvi*—Statistics of the War.)

⁴⁹ Suicide, "N.A.D." and "malingering". Self-inflicted wounds are not included.

⁵⁰ Melancholia, dementias, acute delirium, delusional insanity, myxoedemic insanity, moral insanity, impulsive insanity, exhaustion psychosis, psychasthenia, mental stupor, imbecility, idiocy, feeble-mindedness, alcoholism, tobacco poisoning, morphinism, cocaineism.

Representing as they do with a high degree of accuracy the experience of the A.I.F. in the Mediterranean Expeditionary Force, the figures are of no little interest. The proportion of moral and mental disorder to the total non-battle casualties and their rate per thousand on ration strength is closely in parallel with Australian experience in the campaign on the Western Front. On Gallipoli they amounted to 2.3 per cent. out of a total of 63,932 of non-battle casualties.⁵¹

The uniformity of the total figures for Gallipoli and the Western Front might suggest that the "seed" rather than the "soil"—the nervous and moral constitution of the force and of the individuals comprising it rather than the particular kind of strain to which they were subjected—was the essential element in determining the total amount of nervous "breakdown"—a conclusion which would take us into the very heart of the problem of "war neurosis", and which will be discussed when the experience of the Western Front comes to be dealt with. Figures for the major psychoses do not call for comment.

The reorganisation of the force. After the evacuation of Gallipoli the Australian Light Horse remained in Egypt from which base it played an important and distinctive part in the Sinai, Palestine and Syrian Campaigns. The psychic history of the Light Horse, however, must go by default for lack of material, a fact to be regretted since the experience in this war of movement would have provided an interesting comparison with that of attrition warfare. The infantry, ultimately increased to five divisions, together with most of the special services, moved in March-June 1916 to the Western Front and

⁵¹ It must be noted that the figures cover the whole A.I.F. in the East during the year 1915. No figures sufficiently authentic are available for summarising and analysing the experience of the Gallipoli force itself. Thus the experience of the reinforcements and Base units in Egypt are included.

This, however, is not a serious matter since (1) by far the greater proportion of casualties from this type of disorder are known to have occurred on Gallipoli. (2) The reinforcements and 2nd Division were in Egypt a comparatively short time, and the number of men in the Base units was negligible. (3) Rates are calculated on a basis of strength figures of the Gallipoli force.

Quantitatively, however, they may with reasonable accuracy be compared with the figures for the Western Front. As representing a "type", within the meaning of the classification adopted in the present work, they are remarkably in parallel with these.

The imperfection of diagnostic discrimination prevents exact qualitative comparison.

their experience in the "mental" field there must now be recorded.⁵²

THE WESTERN FRONT

When the A.I.F. arrived in France it found itself part of a military organisation far removed from that of the Eastern theatre. At Gallipoli the A.P.M. had so little to do that for a time he was made chief sanitary officer for the Beach. And though in Egypt the Provost Marshal's Department was much in evidence, its duties mainly concerned the peacetime misdemeanours, such as those of "leave", rather than the graver military "crimes". In the army in France both the opportunity and the occasion for military crime were much more general.⁵³

The Australian force came under the *Army Act and King's Regulations* except where this conflicted with the Australian *Defence Act and Regulations*. If an Australian was convicted under the *Army Act* of a crime punishable by death, the death penalty was passed and recorded, but it could not be carried out without the consent of the Australian Government and this was never given. The medical service was responsible for giving evidence at the Court Martial if called upon to do so, but the gravity of its responsibility was greatly lessened by this policy.

Self-inflicted wounds. The motive that caused this at Gallipoli was largely absent on the Western Front. Statistics for the A.I.F. are not available, but—though special medical

⁵² In connection with this transfer an occurrence of some interest is recorded. In the reorganisation of the force a considerable body of men was weeded out from the 1st, 2nd, 3rd and 5th Divisions on account of physical or (especially) some "moral" defect. These men were by chance ultimately transferred *en bloc* to units of the 4th Division. The general results, so far as observed, are recorded in the *Australian Official History, Vol III, pp. 291-2*.

⁵³ During the war sentences of death passed by Courts Martial in all white troops serving under the British flag (August 1914-31 March 1920), and carried out were:

Mutiny	3	Disobedience	5
Cowardice	18	Sleeping at post	2
Desertion	267	Quitting post	7
Murder	19	Casting away arms	1
Striking or violence	5		

The total number of death sentences passed was 2,719; total carried out 327 (12 per cent.). For offences in general the greatest numbers of convictions were for Absence (37,034), Drunkenness (35,313); Insubordination and disobedience (22,891), Miscellaneous Military Offences (30,147); Self-Inflicted Wounds (3,894); Desertion (7,361), Cowardice (551).

Corresponding figures relating to the A.I.F. alone cannot be obtained. It is understood that the main records of the Provost Marshal's Department in Australia were destroyed after the war and the official conviction forms have not been consolidated.

provision had to be made for such patients—the practice was not common. The unconscious escape into disease (hysteria), the conscious escape into disease (malingering), the escape into wounds (self-inflicted wounds) and the escape into death (suicide), compose a series as to which, though the interest of the subject is very great, no Australian statistics have been compiled. The same must be said for “illegal absence” (A.W.L.).

“*Malingering.*” Figures for “malingering” in the Australian force are practically non-existent, owing to the absence of any exact study of the experiences in the War of the Department of the Judge Advocate General. The official medical diagnosis in a case of feigned disease was “N.A.D.” (“no appreciable disease”). The medical figures for this, as presented in *Chapter XVII*, are negligible, but they do not fully present the situation; for, in order to have his case recorded in the Admission and Discharge Books of a field ambulance, the malingerer must have passed the Regimental Medical Officer, and the R.M.O. as a rule let him off with a caution, and marked him “To duty”.⁵⁴

The methods of malingering in the war were not sufficiently distinctive from those of peace to call for special comment. The chief interest of the matter is the intimate relation of the phenomenon on the one hand to the subject of *self-inflicted wounds* and *suicide*, which belong to the science of “criminology”, and on the other to that form of “flight into disease” in which “conscious” and “unconscious” forms of self-discipline—reasoning and emotion, character and disease—are so mixed up as to have compelled the creation of a self-sufficient branch of medicine—“psychiatry”, or psycho-neurology. By no means always—not perhaps so often as has been implied in many studies of the “war neuroses”—this defeat and flight was the result of defective “mental” material. The severity of the trauma, and the fact that its repetition naturally resulted in a temporary breakdown of resistance, have perhaps, for the Western Front at least, been minimised—just as the ultimate effects of such breakdown have been over-stressed.

⁵⁴ Which carried the implication “no appreciable disease”

The R.M.O. kept no official records of his work. His trials and his reactions to his “try out” in his first sick parades are matters of comment in the previous volumes. The best men reacted not with suspicion but with sympathy and co-operated in a common trial. But the R.M.O. must have his full share of the “Wisdom of the Serpent”—of Aesculapius, and other!

From fear, many men, not depraved or psychopathic, fled into disease, into wounds, even into death itself.

PSYCHO-NEUROSES ON THE WESTERN FRONT

. The *British Official Medical History* states

During 1914 several men were evacuated from France to England owing to having been "broken by their experiences in the retreat from Mons". . . . At the base hospitals, during the late autumn of 1914, Lieut.-Colonel Gordon Holmes saw frequent examples of gross hysterical conditions. . . .⁵⁶
In the B.E.F. At the battle of Neuve Chapelle, in the spring of 1915, there was no appearance of such cases to any great extent. However, in the autumn of the same year, at the battle of Loos, something more serious was observed . . . patients sent from the battle line with definite hysterical manifestations (mutism and tremors). . . . During the winter of 1915-16 it was rare to see or hear of a case of psycho-neurosis in the forward area. But the occurrence of such cases in the armies of other nations during 1915 had compelled their authorities to take steps to deal with the problem. The French early sent medical experts to investigate the cases. . . . The problem in the British Expeditionary Force did not become acute until July 1916, during the battle of the Somme.⁵⁶

The statistical record of these disorders in the British Army is stated by the official medical historian to be very defective, but the experience of 1914-1915 is summarised in the following table:⁵⁷

Functional nervous diseases amongst imperial troops, Aug. to Dec., 1914

	United Kingdom		France	
	Officers	Other Ranks	Officers	Other Ranks
Neurasthenia ..	20	321	65	279
Traumatic neurasthenia	—	10	—	8
Hysteria	—	50	—	11
Shock	—	15	23	114
Shell-shock	—	—	2	18
Totals	20	396	90	430

⁵⁶ Yet Freud has said: "The old ego protects itself from the danger to life by flight into the traumatic neurosis in defending itself against the new ego which it recognises as threatening its life. The National Army was therefore the condition, and fruitful soil, for the appearance of war neuroses; they could not occur in professional soldiers or mercenaries" (Prof. Sigmund Freud in *Introduction to Psycho-Analysis and the War Neuroses* by Drs. S. Ferenczi, Karl Abraham, Ernst Simmel, and Ernest Jones, p. 3 Vienna: The International Psycho-Analytical Press, 1921.) (Italics not in the original.) The matter seems to merit exact enquiry.

⁵⁶ Vol. II, *Diseases of the War*, p. 8.

⁵⁷ From *British Official History of the War, Medical Services Diseases of the War*, Vol II, pp 1-20 (London: H.M.S.O. 1923)

In addition to the above the following cases were associated with gunshot wounds:

	Other Ranks
Neurasthenia	94
Traumatic neurasthenia	21
Hysteria	3
Shell-shock	7
Total	125

The British history adds however:

In an official report written in December 1914 it is stated that 7 to 10 per cent. of all officers, and 3 to 4 per cent. of men admitted to hospitals in Boulogne were sent home suffering from the effects of nervous and mental shock, due to strain, stress and exhaustion. . . .

The most obvious fact that emerges from a study of relevant records is the lack of co-operation, amounting to actual antagonism, between military policy and medical progress; and in the latter the clash between the different schools of scientific thought. The consequence is seen in the inability of the medical service and profession to check the spread of a concept of war neurosis—the idea and the name of “shell-shock”—which, though propounded in good faith as a helpful medical hypothesis, became—through military and social exploitation and mass-suggestion—a devastating menace.

The administrative history of the mental disorders in the B.E.F. reflects very exactly that of the specialties concerned. Hitherto living in amicable co-operative symbiosis, “neurologists” fought what was ultimately a losing battle with the psychiatrists for the no-man’s land between neurology, the medicine of the brain, and psychiatry, the medicine of the mind. The importance of this domain was not at first realised by either party, and only became evident as the “shell-shocked” casualties grew from a trickle in 1914 to a strong spate in 1915, rising to a flood in 1916—the year of the First Somme Battle. The conflict was confused by the fact that neither side understood exactly what it was fighting for, nor yet the confines or content of the contested territory. It was not the least significant element in the contest that the “rank and file” of medical (executive) officers understood little or nothing (and perhaps cared less) of the issues; but only that they had

**The fight
within the
medical service**

to "do something" and do it very urgently. Above it all, intellectually remote from the scientific and professional battle, loomed the Military Command and Medical Directorate, themselves at war for control of the same domain, but concerned with the urgent disciplinary problems involved in any failure of the soldier to face danger. The whole history of medical and military practice and policy in the matter of mental disorder on the Western Front reads indeed like the Battle of the Cards in *Alice in Wonderland*.⁵⁸

In effect, the contested domain was in a great part "grabbed" by an outsider—the general community; which now largely sets the policy to which, in practice at least, the medical service and profession have to conform.⁵⁹

In August 1914 the British Army Medical Service was quite unskilled and inexperienced in dealing with cases of "nervous" breakdown. Lieut.-Colonel C. S. Myers, later
The first appointments, 1914-15 The Consulting Psychologist has recorded:

In the Royal Army Medical Corps there were officers with special knowledge of surgery, pathology, etc., some of whom had achieved a world-wide reputation; but I never met with a regular officer who had any specialist's training and experience in mental or nervous diseases and disorders . . .⁶⁰

Nor is this surprising. "Nervous" disorder was not expected in a soldier and Army regulations provided for the prompt discharge (or evacuation from the field) of "mental" cases, a term which definitely connoted some form of mental alienation or insanity. That in minor disorders of conduct—in other words the functional disorders of the brain—"mind" might be an aetiological factor, calling for exact investigation, was a quite unfamiliar idea.

Within a month of the outbreak of war a well known neurologist, Aldren Turner, was commissioned by the War

⁵⁸ That this is not a fanciful picture can readily be verified from many sources—from the omissions in the otherwise admirable articles dealing with the subject in the *British Official Medical History*, from the successive administrative orders issued by G.H.Q. which reflect this triple conflict, and the record of the reaction to these of the medical units, and from the flood of medical literature, in books and journals which (as men of weight—such as Fielding Garrison—have pointed out) have confused the issues and events.

⁵⁹ A list selected from the books and articles studied for the purpose of this chapter is given at the end of it. As immediately bearing on the above, *The British Official Medical History, Diseases of the War, Vol. II*, may be cited.

⁶⁰ *Shell Shock in France 1914-18*, pp. 16-17.

Office and appointed Consulting Neurologist to the B.E.F. and soon afterwards neurological specialists, Lieut.-Colonels Gordon Holmes and Percy Sargent, were appointed to the Expeditionary Base. The prime purpose in these appointments was to meet the problems presented by wounds of the nervous system. No consultant or specialist in psychiatry was appointed. The increasing incidence of cases of "functional" disorder of the brain and the chance presence in a British Voluntary Hospital, of a trained psychologist, Captain C. S. Myers, who was not, however, a psychiatrist and had "no asylum experience", led Colonel Gordon Holmes to suggest the appointment by the D.G., A.M.S.⁶¹ of Myers as "Specialist in nerve shock". His title was changed in 1916 to "Consulting Psychologist", a position he held till the end of the war.

On Colonel Myers it fell to meet the storm of "shell-shock"—a term which (as he has himself very candidly acknowledged)⁶² was in some degree of his own creating. The source of his troubles was the battle of interests and ideologies referred to above, and especially the failure of the medical directorate of the B.E.F. to appreciate the fact that, in the "current theory" of mental disorders, neurology and psychiatry lay poles apart, and that mental medicine, including psycho-pathology, more properly belonged to the latter. "Mental and moral" casualties and delinquents of all shades of mentality and grades of seriousness were assembled at the medical Bases in France—in particular, Boulogne—with little or no provision for expert discrimination. As Colonel Myers has recorded:

**Early
administrative
methods**

Those of Lieut-Colonel Turner's duties which I took over on 28th March 1915 were officially described as follows: "to select suitable cases of nervous and mental shock and neurasthenia for transference to the appropriate institutions in England for treatment." But in the course of time they became much more numerous and far-reaching. They were gradually extended (a) to advising on and visiting wards provided for all cases of mental disorder and disease, including cases of insanity; (b) to supervising and assisting in the treatment of such cases; (c) to advising in cases of suspected malingering; (d) to examining, and giving court-martial evidence on, soldiers charged with desertion, suicide, drunkenness, or other crimes; (e) to sitting on numerous Medical

⁶¹ Sir Alfred Keogh Throughout this episode and the whole war there is ample evidence of the broad and enlightened outlook of this great soldier and scientist.

⁶² See his book, *Shell Shock in France 1914-18*.

Boards; (f) to examining and diagnosing purely neurological cases (organic lesions in the brain and spinal cord); (g) to differentiating cases of "functional" from those of "organic" disorder, etc.⁶³

The most urgent problem lay in ensuring that at the Expeditionary Bases these cases should be discriminated and treated by men trained to the task. This was not accomplished till well into 1916.

Neurologist

v.

Psychologist

The problem then furnished by the psychoneuroses and psychoses respectively is described by Colonel Myers as follows:

In the middle of August 1916 the title previously given me of "Specialist in Nerve Shock" was changed to "Consulting Psychologist". By the end of that year expert mental specialists had been appointed to the various Bases provided with Mental Wards, and 80 per cent. of my visits were being paid to Front Areas. Receiving "centres" were now, at length, being appointed at the rear of the latter, which treated the readily curable cases of "shell-shock", most of those evacuated to the Bases being henceforth sent to England. In these altered circumstances, I was about to suggest to the Director of Medical Services, Lines of Communication, that my headquarters should be moved nearer to the Front, when, to my surprise, he announced to me a new arrangement, that I should have control of "shell-shock", "mental", and "neurological" cases occurring within the Fourth and Fifth Army Areas and at Dieppe, Le Tréport, Rouen and Havre, leaving the remaining Areas and Bases to Lieut.-Colonel Gordon Holmes who, having recently relinquished his neurological partnership with the surgeon, Colonel Percy Sargent, was seeking other specialist work. Colonel Holmes had previously asked me whether, under the altered conditions of his work, I had any objection to his undertaking the treatment of "functional" cases at the Base; but I did not foresee that my immediate consent would entail such a radical change and restriction in my work.

The proper course would have been for him to be employed in diagnosing and advising on the treatment of strictly neurological cases throughout all hospitals and for me to continue my "shell-shock" and "mental" work as before, each calling in the other in doubtful cases, when the use of his special experience was desirable. But Colonel Holmes informed me that he had been also induced to approach General Headquarters because, having been appointed Consulting Neurologist at the same time as I was appointed Consulting Psychologist, he felt himself responsible for the "shell-shock" cases, although, he confessed, he felt quite incompetent to examine "mental" cases.

Thus it came about that the Director-General bisected the King Solomon's baby claimed by two "mothers"; Colonel Holmes had pre-

⁶³ *Ibid.*, pp. 15-16. He continues: "I vainly pointed out that no expert could be found who would claim special knowledge in all of these kinds of work. For my part, I had had no special 'Asylum' experience, nor had I a specialist's knowledge of neurological diseases. But an Army Medical Officer has to obey commands. They arose in my case partly from ignorance on the part of those who issued them, and partly from the fact that at the time when I began to work on cases of insanity there was no one else available in France."

viously told me that functional "nervous" disorders always formed a very large part of the civilian neurologist's practice. Naturally, therefore, he was little disposed to relinquish in Army life what was so important a source of income in time of peace, although he confessed that (like most "pure" neurologists) he took little interest in such cases. During the past twenty-five years, however, thanks to the work of Janet, Prince, Freud, Jung, Adler, Hart, Rows, Jones and many others, the position has now changed: the neurologist's methods of treating the psycho-neuroses have been very largely superseded by those of the psycho-therapist. These are fundamentally opposed, the former, usually ignorant of normal and abnormal psychology, being content to treat patent symptoms and signs by persuasion or force, the latter aiming primarily at the discovery and abolition of their underlying conscious and unconscious mental origins and maintaining that it is useless to deal with the results and to neglect their causes, if a permanent cure is to be expected. . . .

Ultimately, the situation was stabilised by the tacit, if not explicit, differentiation of psychiatry from neurology. Colonel Myers resumed for a time his original status, and at the beginning of 1918 was transferred to England, whither the centre of movement of the scientific, professional, and administrative maelstrom had shifted, and the problem of the discrimination of types and their appropriate treatment and disposal, and especially the *ultimate national issues* of the problem were assuming dimensions and a gravity even greater than those which had caused so violent a storm in the Army at the front.

Colonel Gordon Holmes undertook the consultant and organising responsibilities of Colonel Myers' previous position and his own; but the need for special training in psychiatry and in particular in psycho-pathology as well as in neurology, was accepted. It was given effect to in the staffing of the "special" hospitals now being established.

The tables given above reflect accurately the position as at the beginning of the war. "Hysteria" and "neurasthenia" stood for broad lines of differentiation of the functional disorders; this, though vaguely apprehended, did reflect some clinical significance.

The scientific aspect

The concept "neurasthenia". It is not easy to translate the mental concepts of to-day—"anxiety", "conflict", "suppression", "repression", "conversion", the "unconscious" and so forth—in

terms of the simple conceptions of 1915-16. The situation may perhaps best be illuminated, not by trying to describe the "system" of diagnosis, treatment and disposal—which in fact at this stage simply did not exist—but by attempting a glance into the general development of conceptions in this matter among the soldiers, administrators, and medical officers then on the Western Front.

Uncovering the "neurotic". The vague concept "neurasthenia" had in effect in the past covered a multitude of neuro-pathic sins—both of fathers and of children.

Nervous breakdown: The resolution of this syndrome had already
"neurasthenia" been undertaken by Janet and the French school, by the school of "psycho-analysis" founded by Freud, and (as is often forgotten) by certain English psychiatrists—such as Ross, Rows, and Mapother—who had found "busy common-sense" (the term is John Keats') a useful aid to intellectual balance. This teaching, however, had not been accepted by the body of British medicine and was wholly alien and repugnant to the military mind. Neither the concepts themselves nor the diagnostic therapeutic structure built on them, still less the nomenclature, was permitted any place in the developing organisation of Army mental medicine. At this time indeed neurology itself was largely occupied in the endeavour to elucidate, in the case of "shell-shocked" men, the mystery of the assorted "nervous" symptoms, obvious and occult—confusion, stupor, amnesia, fugues, tremors, paralyses, anxieties, disablements—by the accredited methods of neuropathology. In particular it attempted this by following—if on more refined lines—the researches of old Sir Thomas Browne in the 17th century—by dissecting the brain in search of the soul.

The French Army, with the tradition of the Salpêtrière and Nancy, was already well advanced in the military adjustment to the problem—far ahead, indeed, of the British, and, it would seem, also of the Germans.

But it is clear that in the early months of the war much of the sickness, both nervous and not obviously so, was recognised by the neurological specialists as being of an "hysterical" or "functional" nature. It was only slowly, however, that there arrived in the B.E.F. a general recognition of the fact that the

congeries of physical, psycho-physical, and obviously psychotic causes of illness and "breakdown" included a very considerable element of true "hysteria" of the type more or less familiar to practitioners, as being not uncommon in women. Yet the first small cloud—"shell-shock"—had appeared on the military horizon at the end of 1914.⁶⁴

Whether the term or the concept, "shell-shock" came first from the medical service or from the soldiers themselves will probably never be known—possibly medical officers adopted almost unconsciously a soldiers' phrase which fitted the novel phenomena.

For in spite of "traumatic neurosis", novel it assuredly was. However clearly we may to-day recognise the essentially "nervous" nature and the usually gradual onset of the phenomena of traumatic neurosis, this was not at first self-evident. Rather the onus of proof seemed to rest on anyone who would question the belief that the mental phenomena, which followed immediately on an observed or supposed physical "shock" to the brain, were due to macro-, micro-, or ultra-microscopic lesions of the brain tissue. "Proof" of this negation was arrived at only after long and difficult clinical and pathological research the course of which will be examined later. On the other hand the concept of "shell-shock" was immediately and enthusiastically accepted.

What was the conscious or unconscious motive for this acceptance? It may be suggested that the motive is to be found, not as is commonly held, in fear of the "unknown" but chiefly in the emotions and impulses underlying what McDougall calls the "self-regarding sentiment" in man's character which, to crude common sense, seems in effect identical with the Freudian

⁶⁴ It has been claimed (in *Recent Advances in the Study of the Psychoneuroses*, p. 16) by Millais Culpin, then an operating surgeon at a C.C.S. that the prevalence of hysteria was first disclosed in an article by himself and the late E. G. Fearnside, in the *British Medical Journal* of 6 Jan 1915 on the anaesthesia often found to supervene on "trench foot". Col Myers on the other hand (*Shell Shock*, pp. 11-12) states that in November 1914 he himself "saw for the first time one of those cases of 'functional' mental and nervous disorder, which afterwards proved so plentiful and came to receive the name of 'Shell-Shock'". . . . Immediately after [a shell] had burst in front of him, his sight, he said, became blurred . . . This man was found to be suffering from 'functionally' contracted fields of vision and slight impairment of visual acuity. . . . I published these cases in the *Lancet* of 13th February 1915. . . . I must have been one of the first to use the term 'Shell-Shock' which has since deservedly received adverse criticism. But I was careful to point out the 'close relations of these cases to those of hysteria'."

"ego-ideal", and may broadly be identified in everyday thought and speech as "self-respect". "Shell-shock" provided for the over-wrought soldier a more or less unconscious escape from the stigma of the essentially feminine failing "hysteria" which itself is an *unconscious* "escape into disease" from an emotional tension and conflict that has become unbearable. So "shell-shock" became a respectable way of escape from the conflict between "fear" and "duty"—the "old ego" and the "new". In each the motivating impulse, conscious or unconscious, is *advantage*. It meant the attainment of "peace with honour" and—at one period of the war—a wound-stripe!

However originating, in the British Army⁶⁵ by the end of 1915 the idea of a direct and causative connection between the "shock" from the "windage" (later called "blast") of a shell-burst, or, illogically enough, the effect of being buried by the earth or debris of a shell explosion, reached a stage that required recognition. Though the idea was reflected in the A. and D. books (and so in statistics) it was not officially recognised till the beginning of 1916 when, in accordance with an army order, these cases when associated with "enemy action" were returned as "wounded", not "sick". The definition of wound was made officially to include cases where nervous symptoms developed "in consequence of enemy action". In June 1916 procedure was formalised by an order of which the following is a summary.⁶⁶

As the term "shell-shock" has come to be vague, and loosely applied to conditions which ought not to be returned as battle casualties, it has been decided to classify cases now returned "shell-shock" as follows:

- (a) Suffering from Shock, Shell
- (b) Suffering from Concussion, Shell
- (c) Suffering from Burns

The letter "W" is to be affixed by the medical officer of the unit to reports of all cases due to battle casualties, and "S" to those due

⁶⁵ There was no exactly corresponding term in the French Army, nor, so far as can be ascertained in the German. The French used the concept "Syndrome commotionné", the Germans the idea of "traumatic neurosis", introduced by Oppenheim in 1889. The French position is admirably summarised in the volume on *Shell Shock or the Psychoneuroses of War* by Dr. G. Roussy and J. Lhermitte in the series of translations edited by Sir Alfred Keogh (contained in the Australian War Memorial Library). See also Jones and others, *Psycho-Analysis and the War Neuroses* with introduction by Freud.

⁶⁶ Issued by D.M.S. Second Army to II Anzac Corps 14 June 1916, but coming from the D.G.M.S., B.E.F.

to accidents other than battle casualties, i.e. "W" = Wound class; "S" = Sick class.

This lettering will invariably be entered on the medical cards of all such cases sent back by M.O's of units, field ambulances and casualty clearing stations.

This was the stage reached in the B.E.F. when in March of 1916 the A.I.F., having reorganised after Gallipoli, was brought to the Western Front with the definite task in view of furnishing part of the reserve necessitated by the plan for a vast Allied offensive on the Somme. The medical events of the three months spent in the "nursery" area of Armentières contain nothing of special psychic interest, the mental strain there not being great.⁶⁷ Australian R.M.O's—many of them new to their job—were informed on the official procedure for dealing with cases of "shell-shock 'W'", but most had had little chance of acquainting themselves at first hand⁶⁸ with the clinical features of this, or of the less dramatic forms of "nervous breakdown". Nor could much written information be obtained.

The subjoined table adopted from the *British Official Medical History* undoubtedly shows the effect of the First Somme Battle (July-Dec. 1916) on the incidence of the acute type of nervous breakdown in the B.E.F.

Record of "shell-shock" cases reported as battle casualties in France, excluding dominions.

1914	1915		1916		1917		1914-17
Sept. to Dec.	1st half	2nd half	1st half	2nd half	1st half	2nd half	Total
9	141	1,246	3,951	16,138	3,010	4,038	28,533

Note. It is believed the British figures summarise the primary admissions (to field ambulances or C.C.S.) and represent "battle casualties". The variations in the orders relating to the diagnosis and disposal of cases of acute nervous breakdown make it, however, impossible to establish any precise relation between the figures and the causes of the casualty.

⁶⁷ The figures from the five Australian Divisions are shown in a table on the following page.

⁶⁸ The official manual *Injuries and Diseases in War*, contained no helpful reference to these conditions until its final edition in 1918.

The figures for cases classified as "Shell-shock—Wounds" for the A.I.F. on the Western Front are given in a statistical summary made at 3rd Echelon (A.I.F. Section) of G.H.Q.:

Shell-shock "W" by years by Divisions

Year.	1st Div.	2nd Div	3rd Div	4th Div	5th Div.	Corps Troops	Total
1916	83	170	3	236	116	5	613
1917	105	125	165	104	357	39	895
1918	14	27	21	13	39	2	116
	202	322	189	353	512	46	1,624

The conditions under which the Battle of the Somme was fought have been described in a general way in *Volume II* of this work and very fully in the Official History, *Volume III*. Three elements in the "shell-shock": psychical environment stand out as dominant:

(1) The "shocking" character of the offensive agents employed, the current tactics allowing a huge amount of high explosive shelling to be concentrated by both sides on certain sectors from which there was no means of escape.⁶⁹

(2) The largely passive and impersonal nature of the battle-experience; after each minor advance the troops must sit tight in sectors of the front system which the enemy then pounded to dust. With this went lack of sleep—the most potent psycho-physical factor in nervous breakdown; also gross discomfort, and poor food. The tension was relieved by only brief "rests", in which exhausting work was often done, before another tour in the front line.

(3) The degeneration of the offensive into a crude contest in attrition devoid of "surprise" or tactical refinement. It became difficult for the soldier to regard his tasks as part of an intelligent plan. Lacking thus the firm "shield of faith" the troops in the later stages of the offensive (in which the A.I.F. took part) were thrown into the inferno morally disarmed save for the traditions of their race and army and the strength of their own character.

The nature of the conditions and the reaction thereto of the Australian soldier are admirably told in the *Australian Official History*, from which the following descriptions are quoted:⁷⁰

⁶⁹ Rightly or wrongly the British command deliberately discouraged the construction of deep dugouts in the front line as tending to reduce the "offensive spirit". Ludendorff and Hindenburg also found it necessary to follow this policy, but the Germans usually dug much more energetically in the rear lines than their opponents, at any rate until the last stages of the war.

⁷⁰ *Australian Official History of the War of 1914-18, Vol III, pp. 658-61*

The experiences to which the infantry were at this stage subjected ripped away in a few moments all those conventions behind which civilised men shelter their true souls even from the milder breezes of life, and left them facing the storm with no other protection than the naked framework of their character. The strain eventually became so great that what is rightly known as courage—the will to persist—would not suffice, since, however keen his will, the machinery of a man's self-control might become deranged.

Of the area in which the infantry lived, Lieut. J. A. Raws, 23rd Battalion, wrote that it was shelled till there remained

nothing but a churned mass of debris with bricks, stones and girders, and bodies pounded to nothing. And forests! There are not even tree trunks left, not a leaf or a twig. All is buried, and churned up again, and buried again. The sad part is that one can see no end of this. If we live to-night, we have to go through to-morrow night, and next week, and next month. Poor wounded devils you meet on the stretchers are laughing with glee. One cannot blame them—they are getting out of this. . . .

. . . We are lousy, stinking, ragged, unshaven, sleepless. . . . I have one puttee, a dead man's helmet, another dead man's gas protector, a dead man's bayonet. My tunic is rotten with other men's blood, and partly spattered with a comrade's brains. . . .

I have had much luck and kept my nerve so far. The awful difficulty is to keep it. The bravest of all often lose it—one becomes a gibbering maniac. The noise of our own guns, the enemy's shells, and the getting lost in the darkness. . . .

Only the men you would have trusted and believed in before proved equal to it. One or two of my friends stood splendidly, like granite rocks round which the seas stormed in vain. They were all junior officers; but many other fine men broke to pieces. Everyone called it shell-shock, but shell-shock is very rare. What 90 per cent. get is justifiable funk, due to the collapse of the helm—of self-control.

The Official Historian comments:

The shelling at Pozières did not merely probe character and nerve; it laid them stark naked as no other experience of the A.I.F. ever did. In a single tour of this battle divisions were subjected to greater stress than in the whole Gallipoli campaign. The shell-fire was infinitely worse than that subsequently experienced in the Third Battle of Ypres.

From the point of view of the medical officer the effect of these conditions may broadly be classified as twofold. Among

a welter of casualties two broad types became differentiated—(1) A smaller number who *ab initio* were mentally and morally neuropathic (or psychopathic) and whose psychic make-up pre-disposed or even pre-ordained them to "nervous breakdown"; and (2) those

**The main
division**

men whose character was sufficiently resistant or resilient to ensure that, with suitable treatment, they would recover from any save the most severe mental strains and shock. But the question what *was* the right treatment had not then been officially laid down; indeed a decision was only then crystallising out from the various conflicting theories, cults and interests.

The differentiation between the two types here mentioned is certainly not hard and fast; in the writer's view, indeed, the evidence points strongly to gradations in mental and moral health. Yet such a discrimination is justified by the fact that common sense and science approve the concept of a broad *norm* of "resistance" to psychic traumata of all kinds as distinct from an "abnormal" liability to succumb to psychic strains and stresses, "shocks" and suggestion.

There was available only meagre information regarding the problem. Indeed "nervous breakdown" was regarded from the military more than from the medical standpoint; medical officers of the A.I.F., executive and administrative, were left to "work out their own salvation"—and that of the soldiers for whom they were responsible. The response, as may be expected, varied with ability, insight, and native character. The character of the R.M.O. was only less accurately reflected in the battalion than that of the O.C. In the first amazement of this new experience, with its flood of casualties, some R.M.O.'s naturally lost their heads⁷¹ but most of them quickly regained their balance and used them. The reaction of such R.M.O.'s, for example, to the results of the worst bombardment that ever fell on Australian troops—at Pozières, from 5th to 7th August 1916—was as follows:

On 7th August (wrote Captain J. T. Jones, R.M.O. 47th Battalion) the Battalion relieved the 48th Battalion [Major Woollard] in the line to the N.E. of Pozières. . . . No dugout was available for an aid-post and wounded had to be attended in a trench. There was a continuous stream of wounded passing through night and day, nearly all due to high explosive shells. . . .

There was a great number of so-called "shell-shock" cases. Most of these were in reality due to exhaustion. Owing to the intensity of the bombardment and the pulverised nature of the soil men were continually being buried and dug out by their companions. After one such experience a man was bruised and exhausted, and they were

⁷¹ The reader will find it interesting and useful to compare this experience with that of the "black ships" at Gallipoli. See *Vol. I*, p. 177.

fortunate who did not have that unpleasant experience. When it was repeated, as it often was several times, even the strongest collapsed and had to be evacuated. There were many who reported as suffering from shell-shock which was plainly of the emotional type. Many also made their way to dressing stations further back who were not for the most part genuine cases. *No true commotional cases of shell-shock were seen.*⁷²

The special interest of this note is in the last sentence. The fact that this officer was familiar with the current theory of causation gives his note a definite scientific value. It provides, from clinical observation, convincing proof of the fact, subsequently arrived at by analysts and now, of course, universally accepted, that "*without prejudice*" to the belief in the unity of mind and body, "shell-shock" as a "wound", in the physical sense and apart from concussion of the brain, is a figment, and that the prohibition against its use should be strictly observed. Yet the need for some term is evident in the writings of even ultra-psychic psychologists. Perhaps "battle shock" provides a useful substitute.

At Pozières (says a very gallant medical officer)⁷³ I had been very close to 'shell-shock' and I carried on under an intense strain ever afterwards. Loss of sleep was, in my opinion, one of the worst contributing factors which precipitate a breakdown under shell-fire, and this should be prevented if it is humanly possible to do so. Short terms of service in the line is the best way to counter it, of course, but this may not be practicable.

This officer records a successful attempt to short-circuit evacuation by providing temporary rest and recuperation. It was put into practice on organised lines by the
A front-line experiment R.M.O. of the 48th Battalion, a distinguished Australian, Major H. H. Woollard.⁷⁴ His report on it, made at the request of the then A.D.M.S. 4th Division, Colonel Barber, stated:

It was only during our second turn in the trenches that I had the opportunity of giving individual attention to these "shell-shock" cases; and the bombardment they were subjected to was, save for one afternoon, not so intense as we had previously experienced. Still, the men had been badly mauled and had suffered heavy losses so that they were less fit to endure.

With our reduced numbers we had the same extent of ground

⁷² The italics are the present writer's

⁷³ Capt R. C. Winn, now a practising psychologist.

⁷⁴ Maj. Woollard, it will be recalled, achieved later a world-wide reputation as an anatomist and anthropologist. See Vol. II.

to defend and the question of evacuating for shell-shock became of paramount importance. I decided to treat each case, and only in the last extremity to evacuate them and then not to the ambulance but to Major Imlay of 48th Bn., who was in charge of the Dump. There they could get rest and food, be worked and returned to the line.

When men reported to me saying they were shocked, I made a comfortable rest for them endeavoured to reassure them.

Spt. ammon. arom.	3	1
Morphia	grs.	$\frac{1}{4}$

I repeated this in half an hour.⁷⁵ At about the end of three-quarters of an hour I was able to rouse them, and the men would volunteer they felt better and would return to the line. I have no accurate figures, but as far as my memory serves some fifteen odd were returned to the line. Personally I think no more than three or five were sent on and these were sent to Major Imlay who employed them and thus they were not off the Battalion strength.

I am sorry that I have not figures to quote, but I am definitely of the opinion that the line of treatment was most useful and of great service to the Battalion.

(Sgd.) H. Woollard, Major, A.A.M.C.
M.O. 48 Bn.

22.8.16.

There is no doubt that in the Australian as in other forces, the general impression of the soldier was that in "shell-shock"

The soldier's belief he was confronted with a new and mysterious form of injury. This was a powerful factor in determining the course of events in many a man who experienced the psycho-physical confusion which (described as "unconsciousness", "stupor", "delirium", "excitement" and so forth) was the most striking feature of violent psycho-physical shock, and the outcome of which, together with that of the subsequent amnesia, coloured at least the immediate future of the patient. But it is equally certain that a very great proportion of the men who sought refuge under the Geneva Cross from the intolerable strains and shocks of this warfare were suffering from exhaustion, a breakdown of the power of resistance, physical and "moral", and not, as in Colonel Campbell's Gallipoli cases, from the culmination of some grave, long-standing disorder of personality, inherited or otherwise and wholly different in origin from the causes that seemed at the time so obvious and convincing.

Treatment and disposal of cases. The stream of cases from the bombardment at Pozzières moved on two lines of evacuation

⁷⁵ Col. Barber commented: "The dose of morphia appears to me to be rather large"

—the more severe to Warloy (M.D.S.) and thence to C.C.S., the slight—which were by far the more numerous—to the “Field Ambulance for Walking Wounded and Sick” at Vadencourt.⁷⁶ The exact numbers and distribution of the Vadencourt cases are fortunately recorded with the Australian war diaries and the reports of the field ambulance commander upon them is also appended.

Lieut.-Colonel W. W. Hearne of the 2nd Field Ambulance reported on the Vadencourt cases as follows.

During the period 22.7.16 to 16.8.16, excluding 112 cases of sickness, 7,183 casualties passed through this field ambulance, officers 79, other ranks 7,104. Of the 79 officer casualties 10 were “shell-shocks”, or about 12 per cent of the whole. Of the 10 shell-shocks 4 were sent to C.C.S. and 6 to Corps Rest Station. All were “shell-shock ‘W’”.

Of the 7,104 casualties among other ranks 1,610 were “shell-shocks” or about 22 per cent. of the whole. Of these only 4 are classified as “sick” and were ticketed “Shell Neurasthenia S”. All the remainder were classified as “Wounded”, viz:—

Shell Shock “W”	1,581	} TOTAL 1,606
Concussion Shell	9	
Shell Neurasthenia “W”	16	

Of these, 990 were sent to Corps Rest Station [7th Field Ambulance] and 616 to C.C.S. The proportion of slight to severe cases, and of each as compared with “Other Casualties”, will be best seen by reference to attached table showing numbers of each for each date, the percentage of the total casualties for each day, represented by shell-shock cases, being indicated in the last line. The Corps Rest Station was established on 28.7.16 and from this date onward 171 cases were sent to C.C.S. and would be classed as severe, while 990 were sent to Corps Rest Station and would be classed as “slight”.

It would be noticed that the proportion of slight cases as compared with those sent to C.C.S. is very high after 6.8.16. Also that the shell-shocks constitute a high percentage of the total casualties from August 7 to 13 inclusive.

Also that the percentage of shell-shock cases bears roughly an inverse ratio to the number of other casualties, being highest when the latter are low and vice versa.

It would appear to me that very many of these cases would be more appropriately described as physical or nervous exhaustion and that they should be classed as Sick rather than as Wounded.

At the end of the Anzac Corps’ tour of service in this offensive (22nd July—3rd September) the D.D.M.S. I Anzac Corps, Colonel C. C. Manifold, summed up the experiences in *Notes on ‘Shell Shock’ cases which have passed through*

⁷⁶ See Vol. II, pp 57, 72. The table on pp. 108-9 shows that most were held.

Disposal of shell-shock cases admitted to

	JULY, 1916														
<i>To</i> C.C.S.	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5
Shell-shock "W"	10	31	71	202	57	72	23	17	11	13	15	2	5	—	14
Concus- sion Shell "W"				3			1	2							
Burns Shell "W"															
Neuras- thenia Shell "W"	1		1						1			1			
Total	11	31	72	205	57	72	24	19	12	13	15	3	5	—	14
<i>To</i> C.R.S.															
Shell-shock "W"							10	31	29	16	9	7	6	6	40
Concus- sion Shell "W"								1							
Burns Shell "W"															
Neuras- thenia Shell "W"								1		6				1	
							10	33	29	22	9	7	6	7	40
Total of all Classes	11	31	72	205	57	72	34	52	41	35	24	10	11	7	54
Total other casual- ties	43	687	180	730	184	297	120	341	43	61	84	72	84	116	826
Percent- age of Shell- shocks	20.37	4.31	28.57	20.85	22.82	19.51	22.07	13.15	49.28	36.45	22.22	12.10	11.57	5.69	6.13

2nd Field Ambulance at Vadencourt 22.7.16—22.8.16.

AUGUST, 1916

6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	TOTAL
26	14	1	9	2	2	3	3	3	3	—	3	8	6	—	—	—	626
								1									7
																	—
																	4
26	14	1	9	2	2	3	3	4	3	—	3	8	6	—	—	—	637
51	133	77	137	113	80	76	37	45	69	10	36	41	48	18	38	29	1192
					1							1		1	1		5
																	—
	1				3												12
51	194	77	137	113	84	76	37	45	69	10	36	42	48	19	39	29	1209
77	148	78	146	115	86	79	40	49	72	10	39	50	54	19	39	29	1846
395	236	99	187	111	79	79	91	138	199	81	101	120	300	68	80	95	6327
16.31	38.54	44.06	48.84	50.88	52.30	50.30	30.53	26.20	26.19	10.98	27.85	29.41	15.25	21.83	32.77	23.38	22.58

some Australian Field Ambulances. This report was made for the D.M.S. Fourth Army and in a later one on 1st February 1918, he re-traversed the ground and recorded the subsequent experiences of the Corps with mental disorder. In the first report he said:

**Colonel
Manifold's
reports**

The period reviewed was from 22nd July to 16th August. The first fact to be noted is that during this time about 283 officers and 10,155 other ranks, wounded, passed through all the field ambulances of this Corps. It may be accepted that probably 1,000 passed through field ambulances of other Corps, but these are not taken into account in any calculation made. Of this number, officers 79 and other ranks 7,183 passed through 2nd Australian Field Ambulance, Vadencourt; and of these 10 and 1,610 respectively had been diagnosed as "shell-shock 'W'" (or 12 per cent. officers and 22 per cent. other ranks of the lightly wounded were ascribed to shock)—

Shell-shock "W"	.. .. .	1,581
Concussion shell "W"	.. .. .	9
Shell neurasthenia "W"	.. .. .	16

In addition to this there were passed through the Officers' Rest Station between 29th July and 18th August 64 officers admitted as wounded, of whom 28 were diagnosed as "shell-shock 'W'" and (eliminating seven in which injury or disease complicated shell-shock) the percentage is 32·7.

There was yet a third main dressing station which took in severely wounded only, and to which 7 officers and 83 other ranks were admitted during a somewhat similar period. These cases may be looked upon as being the more severe class, as they were cases it was considered necessary to send lying down, and of these 91 per cent. were evacuated to casualty clearing station, the remainder to rest station, whereas, of those sent to the lightly wounded station only 17 per cent. went to casualty clearing stations, and the remainder to the Corps Rest Station, once the latter was open to receive.

The O's.C. Field Ambulances concerned are all in agreement that many men are sent down from the firing line diagnosed "shell-shock 'W'" who are not suffering from shell-shock, but from physical and nervous prostration which for the time incapacitates them in much the same way, and which in many cases, particularly in that of officers, is due very largely to the complete absence of sleep, night after night, and who eventually break down with symptoms similar to veritable minor shell-shock cases. One such, was brought to my notice. This officer disclaimed indignantly that he had been suffering from shell-shock, and said his condition was entirely due to not having closed his eyes for one moment during four consecutive nights in the trenches. . . .

Colonel Manifold added:

Another point I would like to make, is that many men who are suffering from simple strain and lack of sleep will see things out for another 12 or 24 hours at perhaps a most critical period when their

services are indispensable, and will do this, buoyed up by a high sense of duty and the instinctive desire to stick it out and to set an example, as well as the sense of shame at failing to do so; if, on the other hand, to this man is offered, as is under present condition of classification, an easy and honourable quittance by withdrawing as "wounded", it is quite likely that he may accept this solution, the failing condition of his own physical and nervous system also abetting him in yielding to it, when he never would have done so had he not been ensuring his appearance on the list of those honourably wounded in battle by quitting. There are also men to whom the accompanying factor of a gold stripe will forcibly appeal. Were it known that the classification of wounded would only hold after searching examination later on, it might be quite possible that the man in question would continue to hold out until relieved in the ordinary way, and not yield to the temptation to quit . . .

In his memorandum of February 1918 Colonel Manifold endeavoured to identify the cause of the extraordinary episode:

This was the first occasion upon which the divisions of this Corps had ever undergone this incessant continuous downpour of heavy projectiles. On the Peninsula they had received a severe baptism of fire on many occasions, but mostly when either in the heat of our advance or when occupying deep well-constructed shell proof dugouts. On the Somme there was nothing of this sort. . .

Under these circumstances of such incessant strain, the fact that manifestations of nervous shock should have appeared in varying degrees was only to have been expected; and during the first three weeks of fighting a very large number of men came back with the diagnosis of shell-shock. But there were other factors to be considered besides those of the men being under new and severe conditions of fire. These were:

1. That shell-shock had been written up greatly both in the lay and medical press, and there was almost a tendency to regard it as a society doctor's patients might a new fashionable complaint. There was a readiness to place all sorts of manifestations due to fatigue and other conditions, such as nervous apprehension, not uncommon in nature, down to shell-shock both on the part of the sufferers and of the medical officers; and so it became a ready diagnosis to make and to accept.

2. The above vogue was undoubtedly augmented by the encouragement given to it by what has since been recognised as a mistaken policy, which was of permitting every man diagnosed as shell-shock in the trenches to be returned as wounded and to wear a wound stripe for life. Whilst this would have no effect on men of the greatest tenacity and grip, yet there must be many weaker vessels in a regiment who, whilst undoubtedly shaken somewhat in nerve, might have made the effort to pull themselves together, had it not been for the attraction which it had to a man—who really felt he had been shaken somewhat by a falling parapet consequent upon the burst of a shell a few feet off—that he earns this distinction for life.

3. Medical officers were not, in all Battalions, men with experience of warfare or of a disciplinary control of men in bulk; and there were

instances in which in consequence of this they were over soft hearted towards a man who perhaps suffered more from a sense of a chill apprehension of what might come, than from any actual definite impression inflicted upon his nervous system more than what should have been momentary; and, once men are allowed to go back easily, the habit becomes infectious, as any panic may in a very large collection of men where necessary disciplinary firmness is not promptly exercised by the medical officer. There was certainly one glaring instance of this in a battalion in which the O.C., to stop the rot caused by such mistaken weakness, had to ask that the R.M.O. might be removed. This, of course, was a very exceptional case. . . .

The rapid return of men to duty was then possible, as no special procedure had been laid down then as to transfer to C.C.S. The 4th Australian Division, who were a newer formation than the 1st and 2nd Divisions, presented the greater number of cases during those early days (mostly of the nature of the man who in civil life, being thrown out of a dog cart and shaken violently, is made by sympathetic friends to lie down on a sofa for an hour and have a whisky and soda or perhaps several according to the responsive attitude of his friends' minds). In this case the sympathetic platoon commander or R.M.O. sent him back to where these luxuries could be obtained. A couple of weeks however soon gave a true perspective, enabling the adoption of a correct diagnosis and treatment; and very quickly the numbers being returned under shell-shock came down to a much truer proportion. . . .

It is clear from indirect evidence that a big proportion of "shell-shock" cases sent on at this time to casualty clearing station were evacuated thence to the Base and from there to Great Britain. It is true that, as with wounds, an attempt was being made to create a system of treatment centres at the Expeditionary Bases. But neither then—nor, it would seem, at any time—was the system that was built up to meet the problem of "neurosis" really brought to completion; and by the time these cases reached the Base their condition had so degraded that only a completely organised campaign of treatment had prospect of success.

The Australian Official records suggest—and personal recollections fully support the belief—that the action of Colonel

A wise step Manifold in establishing an attractive and comfortable "Corps Rest Station" in close proximity to the "Dressing Station for Walking Wounded" was a tactical move of the highest merit.⁷⁷ It served indeed as an effective counter to the mass-suggestion "epidemic" of potential neurosis; for, as was now being realised, this was a stage when, in a

⁷⁷ Col Manifold was unsurpassed in the B.E.F. in his flair for and assiduity in arranging rest and amenities for troops at the front. There is no doubt that his work in this direction was of great value to the Australian force.

large proportion of cases, an incubating "neurosis" might be stopped before it developed.

Everything depended, indeed, on what happened now in the mind of the soldier, sick with the anguish of mental conflict. His "soul's dark cottage" freed from urgent fears, lay empty, swept and garnished; ready for the spirit of courage, faith and self-confidence, or, on the other hand, of defeat and dependence. Lastly—and here lay and lies the crux—the moral and mental *vis medicatrix naturae*⁷⁸ often proves incapable of resisting the insidious motivation—first conscious then semi-conscious, finally unconscious—that impels to the choice of the "broad and easy" way leading to moral and mental destruction.

It is fairly widely known in these days that all the manifestations of acute disorders of mental state and conduct that were seen in the war might occur without the patient's having been in action or even in the front lines. But men to whom this kind of nervous breakdown occurred belonged to the frankly psychopathic order of nervous constitution, and, as we have noted, the larger proportion of nervous breakdown that actually occurred was in more or less "normal" men and was brought about by excessive strain. It should be remembered by the reader of the following pages that the troops whose experiences are described had entered the battle or other tests apparently normal.

It is universally accepted—and was indeed being somewhat vaguely recognised at the end of 1916—that nervous breakdown in a soldier, as in civil life, was the culmination of a more or less prolonged complex of factors. These combined to produce a state of mental and moral tension which, on the occurrence of some terrifying and "shocking" experience, resulted in a condition that was conceived as being identical with "shock". On the other hand

A digression:
technical
"appreciation"
of neurosis

Two stages of
neurosis

⁷⁸ It may be suggested that the *positive* factor in mental and moral, as in physical, recovery still receives inadequate study at the hands of medical psychiatrists. It is true that the *objective* in psycho-analysis is the localising and removal of a moral "foreign body" from the "unconscious" mind, thus permitting the attainment of mental "health". But the infinite excellence of the way of "prevention" suggests that, as a subject for study, the content of the *mens sana* should have precedence over that of the *mens in-sana*. It seems that here lies the chief weakness of the Freudian system, which is based on abnormal, not on normal, psychology.

there was another stage, probably more often consequent simply upon long continued strain—but into which, with inept treatment, men in the former stage also only too easily lapsed—associated with different manifestations and very much more intractable. We have, therefore, two conditions which to appearance, and in some degree actually, were distinct—which may be called the acute and the chronic neuroses. These will be separately described, but it should be borne in mind that *they were part and parcel in the same war experience and the same "disease" process.*

The acute stage of neurosis, being usually the immediate sequel of some terrifying experience, was naturally abundantly illustrated in the casualties from the bombardments at Pozières. From a body of apparently normal men subjected to the Pozières bombardments (and similar experiences later) there arrived at the aid posts and ambulances men suffering from *confusion*, ranging from transient obfuscation to deep stupor, men with signs of mental and physical exhaustion, acute fears, phobias, amnesia, tremor, and a wide field of nascent conscious, semi-conscious or unconscious inhibitions resulting in deafness, speechlessness, visual defects and so forth. The dominant elements in this syndrome were perhaps confusion, exhaustion, depression, fear and amnesia. The diary of Sergeant J. R. Edwards, medical detail attached to the 27th Battalion, gives a good illustration of a mild experience—himself being the patient :

The 2nd Division's task was to capture Pozières ridge. Telfer and I missed the battle, as we were buried at la Boisselle, a night or two before the attack. We were lying together in a recess, cut in a trench running alongside the la Boisselle-Pozières Road. The Hun was shelling the road between la Boisselle and Albert almost continuously, but at 1 a.m. he shortened his range, and began to scatter them round the relics of la Boisselle. One came pretty close . . . then a 5.9 landed fair on the parapet above our "possie". It broke down the 3 or 4 feet of earth above the recess, and buried us. I could just hear Telfer calling out—I believe his head was free.

I tried to raise a cry but the earth was over my face, and my hands were pinned across my chest by the weight, as I was lying on my back. I struggled like hell but could do nothing. All of a sudden the pressure became heavier; it was irresistible, and I was blotted out. I recollect thinking "I'm gone", and knew nothing more until coming to in the Colonel's dugout some time later. One could not ask for an easier death.

Bert and Jim were the rescuers. They were at us with shovels

in a tick. What luck to strike shovels in a trench at that dark hour. I believe they battled on with shells falling all around—taking every chance—and at last got Telfer out. To get him they had to pull out a wooden strut which had been holding up the ground. It was the fall of earth consequent upon the removal of this stick that finished me. Jim dug my feet clear, and they yanked me out. The doctor thought I was gone, but I soon revived when water was thrown on my face, and it took four swaddies to hold me on the stretcher. I believe I yelled and screeched like mad. Evidently resurrection is a tougher ordeal than death. They got a light to examine me, and according to Bert, when I saw the light I “went limp, and was as mild as mother’s milk”.

However, something had been jarred inside my tough old nut, and my memory was affected. For instance, I would recognise the boys, but for the life of me could not recall their names. It was a couple of hours before I got a bit of sense, and then they took Telf and myself to an A.D.S. at Bécourt.

Edwards was admitted to hospital on 30th July 1916 with “shell-shock and concussion”. On August 5th he was discharged and rejoined his battalion, and he served until the end of the war. And there was ample evidence that, wisely treated, men affected with the acute form of “shell-shock” could normally return quickly to duty as fit for it as their comrades.

The “nervous” casualties from such a battle as the Somme first appear as a congeries of mentally broken men, largely undifferentiated. From this there will separate out the various types and special syndromes that will make up the ultimate psychopathic picture. But one of the most important medical “lessons” was this, that a large proportion will not have developed *and need not necessarily develop*, any definite and established symptom-complex indicative of one or other of the recognised neuropathic types—hysteria, anxiety, phobias and obsession indicative of what has been designated above as the “chronic” stage; it is indeed the prime purpose of this chapter to indicate and illustrate this fact.

The psychic events of the Somme bombardments focussed attention on what has been called in these pages the acute

**The chronic
form: war
neurosis**

form of war neurosis—what now may perhaps legitimately be termed “battle shock”. The causation of the other or “chronic” manifestations of neurotic disorder in the A.I.F. is perhaps better illustrated by reference to the next period of warfare experienced by the Australian divisions in France, that is, the period known in the A.I.F. as the “Somme Winter”,

and the long wearing down offensive that followed in 1917. To illustrate one of the conditions—a form of fear—that might begin the descent of a less resistant man into this type of neurosis, the writer will draw, as he has previously done, on the descriptive genius of Captain G. D. Mitchell. Writing of the beginning of the 1916 winter he says:

To the right of us was the steep bank. . . . Nearby ran a deserted sap into Fritzland. There lay my pal James with his rifle ready. I visualised a helmeted Fritz at the other end in just such an attitude.

Darkness ushered in a still, menacing night. On such a night as this could dead men walk, and speak to us who were out beyond the ways of life only waiting the reaper. Dread and foreboding possessed me as I went on listening duty. The night seemed to be full of warning voices that made no sound, but formed their messages in the brain. As Godfrey wrote in the *Anzac Book*:

"This is indeed a false, false night;
There's not a soldier sleeps,
But like a ghost stands to his post,
While Death through the long sap creeps."

In that hour was born in me a fear that lasted throughout the whole winter. It was the dread of dying in the mud, going down into that stinking morass and though dead being conscious throughout the ages. It was probably a form of claustrophobia.

Waves of fear at times threatened to overwhelm me but that I kept a tight rein on myself. A little weakness, a little slackening of control at times and I might have gone over the border line. In the light of the sun, on firm ground I could laugh at Fate. But where the churned mud half hid and half revealed bodies, where dead hands reached out of the morass, seeming to implore aid—there I had to hold tight.⁷⁹

The one supreme psychopathic element in the war-environment was the emotion of Fear (the affective element in the primitive instinct to flight from overpowering danger); in particular in its nascent state of "apprehension", the fear of the unknown. Of this excitant of fear⁸⁰ McDougall says:⁸¹

Fear, whether its impulse be to flight or to concealment, is characterised by the fact that its excitement, more than that of any other instinct, tends to bring to an end at once all other mental activity, riveting the attention upon its object to the exclusion of all others; owing, probably, to this extreme concentration of attention, as well

⁷⁹ From "The Winter of 1916-17" by Capt. G. D. Mitchell, M.C., D.C.M., 10th and 48th Bns A.I.F. *Reveille*, 1 Dec. 1934.

⁸⁰ Compare the influence of apprehension in the creation of the gas effect syndrome

⁸¹ *Social Psychology*, pp. 54-55.

as the violence of the emotion, the excitement of this instinct makes a deep and lasting impression on the mind.

. . . Fear, once roused, haunts the mind; it comes back alike in dreams and in waking life, bringing with it vivid memories of the terrifying impression. It is thus the great inhibitor of action, both present action and future.

The environmental element in chronic breakdown. It is a common and fundamental error—attesting the impropriety of the term—to conceive of “shell-shock” as essentially a sudden affair, of the nature of a “wound”—whence the official diagnosis “shell-shock ‘W’”. There can be no doubt whatever that in the vast majority of cases when a soldier suffered a nervous breakdown he was himself aware, often without acknowledging it to himself, that he was becoming “unhinged”—that his resisting powers were losing the battle.⁸²

The Shell Shock Committee⁸³ reporting in 1922 identified the following as primary syndromes:

- (a) Fatigue cases.
- (b) Exhaustion and confusional states.
- (c) Conversion hysteria.
- (d) Anxiety states.
- (e) Obsessional states.

The Committee accepted the principle that each of these states might require certain special forms of psychiatric treatment as well as the general ones. Without entering upon a description or discussion of these the following points may be noted:

Psychogenic factors. Following all psychologists save the confirmed Freudians,⁸⁴ the present writer would identify as the fundamental element in the motivation of war neurosis the urge of self-preservation, as distinct from the other primal biological urge of race preservation, or “sex”. It is, however, fully accepted that a pre-existing neurotic constitution may have been created by the latter. In the immediate impulse the escape or advantage motive is probably dominant; but with it

⁸² This has nowhere been better described than by Robt. Graves (*Good-bye to all that*) to whom medicine at least owes a debt for a courageous and most intelligent self-analysis by a fine soldier and a gifted writer.

⁸³ *Report of the War Office Committee of Enquiry into ‘Shell Shock’ 1922.*

⁸⁴ For the claims of the Freudian concept of war neurosis the reader is referred to the admirably balanced and scientific presentation of the subject in the small work edited by Ernest Jones—*Psycho-Analysis and the War Neuroses* (The International Psycho-Analytical Library, No. 2) with Introduction by Dr. Freud.

the writer would associate the *positive* emotion or instinct of *nostalgia*—the power of which is often under-estimated.

No attempt will be made in these pages to distinguish the special pets of the several schools of psychogenesis. After all, the outlook and teaching of all the schools—of Freud, of Jung, of Adler, of Watson and of the British school of applied common sense which seeks to “try all things and hold fast that which is good”—merely identify certain elements of truth.

The hereditary element in psychogenesis has already been referred to. Probably, with Ross, the reader might wisely accept the principle that the most important point in this connection is that a bad “heredity” only makes a good “education” the more imperative. Of specific immediate factors it may suffice to enumerate—fear and nostalgia, advantage, patriotism, duty, conscience, anxiety, conflict; and so “dissociation” and the “unconscious” suppressions and “conversions”.

Out of the welter of opposing doctrines that controlled the disposal and treatment of the minor psychotic disorders of **Mental Conflict** conduct, there appears one unifying concept—that of a mental “conflict”; or a true civil war of impulses within the man himself, seriously upsetting the mental equilibrium so hardly achieved in the educative years and so precariously maintained through the strains of social adaptation, economic and sexual. This conflict has already been examined in describing the experience of the A.I.F. on Gallipoli.

The chief war neuroses. (1) *Hysteria.* The unconscious “flight into disease” is proverbial for its protean manifestations, and in war these were even more diverse and bizarre than in the feminine type in peace. They have been conveniently listed⁸⁵ as follows:

Conversion Hysteria—traumatic or post-traumatic.

I. Massive Dissociated States—

- (i) Fugues and wandering with some amnesia.
- (ii) Twilight states with automatic movements.
- (iii) Convulsive attacks, sometimes with mimetic actions.
- (iv) Cataleptic and catatonic rigidity and states of immobility.

II. States of Partial Dissociation—

- (i) Hysterical paralysis and fixations.
- (ii) Hysterical sensory disturbances, somatic and visceral, including such syndromes as “left infra-mammary pain”.

⁸⁵ In *The Neuroses in War* by Emanuel Miller, Appendix C.

(2) *Anxiety phobia* (in everyday language, "worry"). It is believed that if the "somatic neuroses" are excluded, less than fifty per cent. of the total of chronic neuroses belonged to this group. It contained those men who continued to live over again the horrors of the war and remained anguished and terrified—contrasting strongly with the peaceful and happy men whose unconscious mind had converted their fears into the simulacrum of disease—"hysteria". A misunderstanding of this type led Sir Philip Gibbs to his unwarranted reproach to the Ministry of Pensions concerning men who

had done their duty with the best of them, but now in the time of forgetfulness were forgotten, and the busy joyous selfish world passed them by, not guessing at the tragedy of these wounded souls, these nervous wrecks, these sad-eyed stammering, wan-looking fellows, who wept sometimes in their lonely rooms and dared not apply for jobs which they knew they could not hold, even if luck gave them a chance. . . . Tragedies pitiable beyond all words, because they have been suffered in loneliness, in the agony of long-waking nights with secret fears hidden even from wives and mothers.⁸⁶

While, *mutatis mutandis*, this description conveys, accurately enough, the early stage of chronic anxiety and the final result of a few cases, it cannot be too strongly emphasised that in the great majority the condition *could* be cured and the permanent and irreversible disorder *could* be avoided. But in a large proportion also "prevention" and preventive treatment were the only "cure".

On these premises there may be suggested—as consonant with the teaching that by the end of the war had become familiar among both neurologists and psychiatrists—

Summary

the following sequence of the neurotic constitution as developed in the warfare of 1914-18.⁸⁷

Mental conflict—fear (the instinct of self-preservation) fighting against "conscience" (the sentiment of self-regard and social sacrifice, discipline, *esprit de corps* and so forth).

The "*anxiety state*" ("worry")—leading to increasing inefficiency and engrossment in self-feeling, fantasies, dreams, phobias.

⁸⁶ From *Overseas*, Jan. 1927.

⁸⁷ This may or may not be associated with a definite "personal" or "family" history. Dr. Campbell (it will be recalled) found this usual.

Moral and mental and perhaps a physical shock—the “last straw”.

Stupor—with or without physical cause (as from “commotion” through “windage” or “blast”).

Confusion and amnesia—the nascent stage of neurosis.

Psycho-neuroses of types appropriate to the mental and moral temperament, disposition and character of the individual. Officers for example were most often overcome by anxiety and gave way to psychopathic phobias, but other ranks to hysteria. The unconscious motivating factor in both cases was the same—escape from conflict.

The conception of “shell-shock” that was still general at the end of 1916 is indicated by the fact that in the report of
End of 1916 proceedings of the Interallied Conference of February 1917, a French delegate, Inspector General Simonin, adopted classification into “emotional” and “commotional” syndromes, “the second being much the graver and probably in many instances being associated with actual trauma of the nerve centres”.⁸⁸ The crude concept of “cerebral commotion” was afterwards relegated—perhaps with too abject a concession to the claims of abstract concepts—to the position of an occasional and unessential factor in a morbid process that was predominantly “mental”.

By 1917 there had occurred in every army a reaction against the bare materialism of so-called “shell-shock”. This reaction tended to emphasise the essential distinction between the frail body of man, and his unconquerable spirit and, clinically if not philosophically, to interpret disordered conduct by divorcing *nervous* from *psychic* activity—in other words divorcing brain from “mind”. Yet scientific study of the phenomenon of “shock” has since disclosed relations that seem to permit the rudiments of a re-synthesis.⁸⁹

We return now to the “rough and tumble” of attrition

⁸⁸ These interesting reports are held by the Australian War Memorial.

⁸⁹ Certainly, the physical and the “nervous” shock from explosion were closely related. Crile’s definition of wound *shock* may be recalled—“a state of exhaustion which has been rapidly developed by psychic, traumatic, toxic or thermal stimuli”. See also *BMJ*, 8 Sept 1934, p. 4887, and cf. *The Neuroses in War*, Edited by Emanuel Miller, p. 102.

warfare in 1916. The task of diagnosing psycho-neurosis is (in order of importance) *negative* and *positive*—negative by exclusion of “organic” disease, for which task a neurological training is required; positive, by recognition⁹⁰ of the “neurotic” nature of the condition, and by the discrimination of it from “true” or major psychoses. For this a psychiatric training is required.

By the end of 1916 this had been recognised in the British Army, and by the middle of 1917 the decision had been satisfactorily implemented. The most important step was the selection and training of a body of officers qualified by both training and experience to meet the special problems of war psychology. This important development calls now for notice.

**The move for
scientific
discrimination:
N.Y.D.N.**

It would be difficult to over-estimate the importance of the desire by G.H.Q., B.E.F. to bring neurotic casualties into line with “disease”, and to control disposal and treatment by *exact diagnosis*. There is no need to attempt to allocate the credit for this innovation; from what has already been said it will be clear that it was an obvious and urgent necessity. The Somme battle provided not only a flood of mentally disordered conduct but a spate of delinquency. By this time also the problem of *insanity*, as a cause of disordered conduct, was proving difficult, and was recognised as part and parcel with those of “shell-shock ‘W’”, of the *military crimes of cowardice, malingering, and S.I.W.*, and of the “neuroses”. Here was an assortment of syndromes for which neither diagnostic “physical signs” nor scientific pathological findings were available on which to base an ordered system of scientific discrimination. It is, however, characteristic of this episode of the war that the most pressing demand for diagnostic stations arose from the recognised necessity for discriminating “shell-shock ‘W’” from “nervous” disorders of other kinds. This was met by (1) a direction that all cases in which doubt existed as to the nature—and especially the cause—of nervous breakdown were to be marked N.Y.D.N. (“Not Yet Diagnosed—Nervous”) and sent to special

⁹⁰ Through clinical insight, or by “therapeutic” test.

units;⁹¹ and (2) the allocation of special casualty clearing stations or stationary hospitals for this purpose—with selected staffs.⁹²

This experiment completely changed the administrative aspect of these problems at the front and opened up a new and wide vista of scientific advance in discrimination and treatment. The chief effects of the new system were, first, to identify the acute and chronic syndromes as essentially aspects of one and the same problem—a problem strictly within the province of psycho-therapy; and, second, to make uniform the problem of discrimination, and thus of treatment, as between the various forms in which “minor” mental disorder became manifest.

The following interesting account of the organisation of these centres and of the lines of treatment is taken from the *British Official Medical History*,⁹³ as also is the diagram of the layout of the centres:

⁹¹ The very practical principle and reasons on which these actions were based are given in a letter of 14 October 1916 from Lieut.-Gen. G. H. Fowke, Haig's adjutant general. He says.

“Those who when engaged with the enemy fail to maintain mental equilibrium do so either—(1) Because they are lacking in the nerve stability which must be assumed to be inherent in all soldiers, or (2) Because they have been subjected to some extraordinary exposure not incidental to all military operations

“Those who have committed themselves for the first of the above reasons cannot be allowed to escape disciplinary action on the ground of a medical diagnosis of ‘shell-shock’ or ‘neurasthenia’ or ‘inability to stand shell-fire’.

“It has too often happened that officers and men who have failed in their duty have used such expressions to describe their state of non-effectiveness, and medical officers, without due consideration of the military issues at stake, have accepted such cases as being in the same category as ordinary illness. The undesirability of disposing of such cases in this way should be brought to the notice of Administrative Medical Officers, between whom and the ‘A’ Branch of the staff of the formation concerned should be close co-operation in dealing with each case on its merits

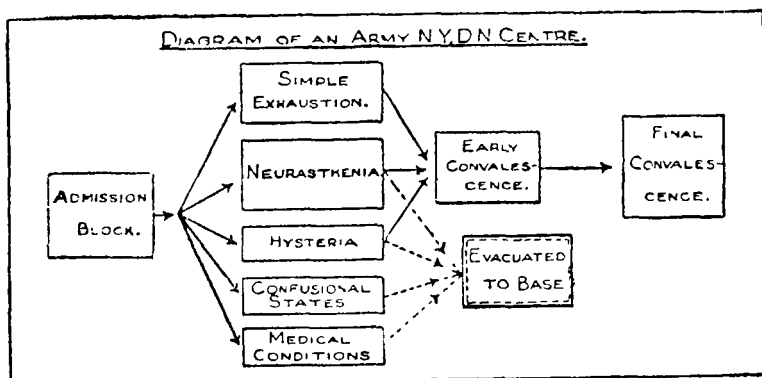
“It should be for a Court Martial to decide whether the evidence as to the existence of actual disease is such as to justify absolving an offender from penal consequences.

“The Commander-in-Chief considers it desirable that all cases of nerve failure should be retained in the Army area until they have been carefully investigated and have been found to involve no disciplinary aspect. If the medical condition necessitates early transfer to the Base, all possible particulars that may be required for future disciplinary action should be obtained before the transfer is carried out.

“Nerve failure believed to belong to the second class of cases, those due to extraordinary exposure, should not be classified as a wound on medical authority alone. The diagnosis ‘shell-shock wound’ should in no case be made until the evidence of the Commanding Officer or soldier affected has been obtained that his condition originated immediately upon his being exposed to the effects of a specific explosion”.

⁹² These were (at the end of 1916) First and Second Armies—No. 4 S.H., Arques; Third Army—No. 6, Frévent, Fifth Army—No. 3 Canadian, Doullens, Fourth Army—No. 21 C.C.S., Corbie. In July 1917 No. 62 C.C.S. was added, for the Third Battle of Ypres.

⁹³ *Diseases of the War*, Vol II, pp. 10-12.



These centres soon proved their usefulness, and in July 1917 a new centre for the Fifth Army was opened at No. 62 Casualty Clearing Station at Haringhe . . . Each special centre was under the command of a lieutenant-colonel of the Royal Army Medical Corps, who was responsible for all administration. Treatment was entrusted to the specialist officers attached to the units; but it was essential that the medical officers dealing with these patients should themselves possess the power of maintaining discipline. . . . The state of the majority of patients in the forward area required very little to turn the balance on the one hand to a rapid improvement, or on the other hand to a state of confirmed psycho-neurosis. Those troops especially who had had but short periods of training were deficient in that moral conviction which it is the aim of discipline to establish. . . . All cases on arrival were sent to an admission block, which varied in accommodation according to requirements. Here they were sorted out at the earliest possible moment into the following groups: (1) Simple exhaustion; (2) neurasthenia; (3) hysteria; (4) confusional and mental states; (5) miscellaneous medical conditions. Each group was kept distinct in separate wards. As recovery took place patients were passed into a convalescent block, which was divided into two portions—early convalescence and final convalescence. Those who did not improve within ten days, together with those who became worse, were evacuated to the Base.

TREATMENT OF THE WAR NEUROSES

It is not proposed to enter upon a complete account of the treatment of the war neurosis. In the first place, mainly through the "six months' policy" and its various outcomes⁹⁴ it did not enter into the medical experience of the A.I.F. overseas, or only sporadically and incidentally. Moreover the neuroses

⁹⁴ See Vol II, Chap. xv, also Chaps xiii and xv of the present volume

of the war were fundamentally identical with those of peace differing only in their external features, in the acuteness of their onset and, usually, in their recent origin and superficial nature, and the obvious content of "advantage" in the great majority. But the special features of the problem of treatment have already been mentioned in considering the measures taken to meet the occurrence of "shell-shock" in mass at the front.

**Expert
treatment
at the front**

It is happily possible to lay down a vital principle, arrived at during the war by the hard road of experience—that the paramount necessity in the treatment of acute war neurosis is discrimination and prophylaxis.⁹⁵

By early detection of the first signs of mental conflict the good R.M.O. could greatly augment his positive influence in preventing acute breakdown in battle strain. Discrimination and prophylaxis are essentially complementary. The first and most important factor in prophylaxis was to distinguish those men in whom the breakdown was due, not or not chiefly to some deep-seated "neurotic" tendency, inherited or acquired, in which the acute strain of battle was merely the final factor, but to unbearable tension on a "normal" individual. This having been done, it was possible to employ methods of disposal and of treatment that would permit the cure and the return to duty of large numbers of men who would otherwise be evacuated to the Base with a grave possibility of themselves developing—through introspection or through infection by suggestion—a neuropathic "complex".

The British *Shell Shock Committee* after the war was emphatic on this point, and its conclusions accord entirely with the experience of the A.I.F. The principle of treatment recommended may perhaps be summed up in the phrase "informed common sense". The following may be endorsed with a warning that the "forcefulness" advocated involves its own dangers.

Realising that prompt application of the correct psychological

⁹⁵ All the elemental factors—the "constants"—in the problem of the treatment of war wounds and wounded men (see Vol. II, Chap. xi) have their exact parallel in the treatment of acute nervous breakdown. In particular, the time-element in the psychogenic process is of the same order of importance with (and is curiously close in actual time-limit to) that which obtains in the pathogenic processes of wound-shock and wound infection.

influence can undoubtedly save a great number of these cases from becoming "casualties", it is recommended that treatment should begin at the Regimental Aid Post. Here the patient will be in the hands of the Regimental Medical Officer and his assistants, who probably know the patient. After a brief period of rest, strong moral suasion and energetic persuasive methods should be adopted following an attempt to reassure the patient as to the facts of his disability. . . . Without, perhaps, going to the extent of regarding every case as a possible malingerer, . . . yet the measures taken must be determinedly stringent and forceful. . . . By this means a great majority of cases may be restored at once to duty and will be saved from a further development and fixation of their disorders. Such cases recoverable by these means would include cases of Fatigue, mild Exhaustion and mild Confusional states, early Hysterical Dissociations and Amnesias, and many of the Conversion Hysterias. The Anxiety states, the Obsessional states, and severer Exhaustion and Confusional conditions would not respond, nor would a number of the Conversion Hysterias in whom the personality was of a low grade and strongly anti-moral.

It should be noted that very little harm could be done at this stage even by misapplied forceful persuasion to a non-responsive case; in comparison to the stress of actual battle, which has caused the disability which is intractable to early treatment, the most forceful methods of persuasion or suggestion are negligible as regards their capacity for producing any deleterious results.

Cases in which the condition is refractory to this early and elementary treatment, or cases which, owing to pressure of circumstance, cannot be dealt with at once, should be evacuated, sorted out at the field ambulance, and sent straight away to the Special Neurological Receiving Centre.⁹⁶

Sir William Osler has written: "What the pathologist thinks to-day the physician does to-morrow."⁹⁷ The acknowledged defects in the treatment and disposal of men suffering from war neuroses in the first three years of the war were largely due to the confusion at the outset of the war in the theory and teaching in the subject. These were accentuated to the *n*th degree by delay in accepting the psychogenic origin of war neuroses. This delay was mainly due to the dominance of the concept of "shell-shock", which prevented a scientific comprehension and discrimination of the various morbid syndromes, and in particular of their largely psychogenic nature.

Treatment of the chronic or established stage of war neurosis comprised: (a) The removal of symptoms and (b) the treatment of the underlying neurotic constitution and/or neuropathic state. Gradually these several types of case were

⁹⁶ War Office Committee, *Enquiry into Shell Shock*, p. 133.

⁹⁷ Sir Wm. Osler. *The Oxford Medicine*, Vol. I, p. 695.

discriminated and treated on lines that assimilated more and more definitely *all* that could be found useful in all the systems and schools of psychotherapy. Besides the basic principles of rest, sleep, food, quiet and so forth, hypnotism, suggestion, persuasion, stimulation, and discipline were applied by experts. Deep analysis was not used at the front. In this as in other matters the war situation required *results*.⁹⁸ Scientific knowledge and research had to be applied on a strictly pragmatic basis for the purpose of winning the war.

In both France and England, two schools of theory and practice developed, representing two aspects both of the scientific theory and of the military requirements. The one aimed at removing obvious manifestations of moral defeat in "neurosis" or anxiety phobias and relied on the *vis medicatrix naturae* to effect at least a mental *restitutio ad integrum*. Amazing results were found possible in hysteria by quite simple methods applied with technical skill.⁹⁹ The other school taught that the removal of "conversions" and phobias was useless without some attempt to deal with the deeper personality-structure which underlay them.

In 1918 came a further change, with the realisation that "shell-shock" and "N.Y.D.N." were only an incident, though a deeply disturbing one, in the medical history of psychiatry and neurology in the war. The primary reason for establishing the classification N.Y.D.N. had been—not to assist in the diagnosis, treatment, and proper disposal of sufferers from

**1918, and
clinical sanity:
in the B.E.F.**

⁹⁸ Followers of Freud have complained that the bigotry of the neurologists refused to them any place in the war-effort. (cf. Jones, Culpin.) It seems to be quite true that the methods and the philosophy of Freud did not receive official recognition or place; but there were faults on both sides—"Freudian" psycho-analysis was a "closed" cult. Quite apart from the early crudities of the philosophy, which evoked emotional and intellectual reaction, the methods of psychological medicine, as revealed by the Freudian method of psycho-analysis and as interpreted in terms of the Freudian philosophy, were quite unsuited to war needs. But there is full evidence that before the end of the war the essential principles and concepts of the Freudian system (of the "unconscious" causes of behaviour, the nature of hysteria, the place of "anxiety", "conflict" and the gain motive) in the genesis of the war neuroses, were well recognised. They were indeed an essential part of the stock-in-trade of the officers who from early in 1917 were responsible for the treatment of the cases admitted to the special hospitals for psychiatric casualties—at the front, at the Bases in France, and in England.

⁹⁹ The French reduced the treatment to a mass-routine. Dr. Yealland's dramatic results in hysteria were based on an exact technique applied with confidence.

psycho-neurosis, but to regulate the allocation of the wound-stripe for "shell-shock 'W' ". But in the light of exact research at the special hospitals "shell-shock" was soon revealed for what it was—a physical explanation of a moral and mental disorder; no justification for it could be gained by any of the methods of research known to science. Instead, it was made clear that, whatever physiological processes might underlie them, the only identifiable factors in the production of "shell-shock" were psychic—moral and mental. Accordingly, first the diagnosis "shell-shock 'W' ", and then the term "shell-shock" itself were generally forbidden. Thereupon the classification N.Y.D.N. became unnecessary; it had indeed proved undesirable.¹⁰⁰

By the middle of 1918 the classification "N.Y.D.N." had so well served its incidental purpose of *education*, that it was now shunned as a diagnosis, and at the forward stations men were dealt with and evacuated under their correct diagnostic titles. By this time as the *British Official History* records¹

There existed one such forward centre for each army area. Any cases which these centres had to send down the line were evacuated to special neurological hospitals at the base, and in this way the whole subject remained under control

The report of Colonel Manifold already quoted gives an excellent account of the developments in the A.I.F. subsequent to the Somme:

¹⁰⁰ Lieut.-Col. Gordon Holmes, Consulting Neurologist, wrote to the DMS, Second Army on 30 May 1918.

"In continuation of my conversation with you yesterday with reference to cases evacuated from Front Line Areas marked N.Y.D.N., I beg to point out that a very large proportion of all these patients present no nervous symptoms. Those cases which are wrongly diagnosed fall chiefly into the following groups:

(1) P.U.O., and especially recurrent Trench Fever.

(2) Men who had been shaken up by the explosion of a shell or buried; the majority of these require no treatment and are fit for duty after a few days' rest

(3) Cases of temporary fatigue and exhaustion.

"It is for several reasons undesirable that men who suffer with no pronounced nervous disorders should be labelled N.Y.D.N., or sent to special N.Y.D.N. Centres. In the first place the fact that A.F.W. 3436 must be rendered and filled up throws a considerable amount of work on the Centres, and frequently delays for considerable periods the return of fit men to their units. Secondly, if the men are suggestible or anxious to avoid service they readily assume or assimilate symptoms which they observe in other patients. Finally, if again admitted to hospital with nervous symptoms they are likely to be evacuated to England or recommended for employment on the L. of C as unsuitable for front line service, if they can produce evidence that they had been previously in an N.Y.D.N. Centre"

¹ *Diseases of the War*, Vol. II, p. 11.

The rule that all cases marked by an R.M.O. "N.Y.D.N." had to be sent to this special hospital told detrimentally, and later on the rule was modified from G.H.Q., and field ambulances **In the A.I.F.** were allowed to change the diagnosis; but in the meantime, in this Corps, R.M.O.'s were instructed—when they were uncertain as to a case being due to anything more than fatigue and an active apprehension—to put on the field medical cards "N.Y.D. (fatigue?)" which gave the Field Ambulance Commander a freer hand. . . .

It has been found that nearly all cases of N.Y.D.N. have occurred during a large offensive operation, and that it has been a rare occurrence to get these cases from the casual promiscuous shelling which goes on in the firing line in what are termed normal times. During the Passchendaele operations the inconvenience and delay of sending all cases diagnosed by the R.M.O. as N.Y.D.N. back to a special casualty clearing station was pointed out, and a ruling was given that the diagnosis could be altered in the field ambulance when the man was only temporarily shaken. Cases became much fewer as the Passchendaele operations continued, although the shell-fire never slackened. This is what we may invariably look for and though these slighter cases may be genuine enough up to a certain point, yet the rapid decrease in numbers shows that, except in the gravest form (which is very rare) the whole matter rests upon a power of inhibition and control being fully exercised.

With the severe gas-shellings that increased in 1918 there came into prominence a "gas effect" complex and neurosis.

This had to be met by establishing "N.Y.D. **The "gas effect" phobia—** Gas" diagnostic centres; and an organisation for dealing with the cases so denoted. **"N.Y.D. Gas"**

The creation of a mass-neurosis in relation to supposed "gassing" was especially noted by Australian observers when the American troops, who had been constantly warned about gas and hastily drilled in meeting it but who had no experience of it in action, were brought suddenly into the field in 1918 in front of Amiens and at the Hindenburg Line. The war diaries of Australian units repeatedly comment on the large number of inexperienced American soldiers who passed through the Australian posts complaining, with obvious sincerity, of having been "gassed", but who presented no symptoms or physical signs suggesting that they had actually inhaled any form of poison-gas in amount sufficient to be harmful.

The post-war history of the A.E.F. provides the final sequel to such episodes in recording that the number of pension

claims for "gassing" far exceeded the number of American soldiers who could have been gassed.²

The *intervening phase* is supplied by the following quotation from Professor Lorenz,³ which illustrates well the psychic "rake's progress" from a fear to a fantasy, and thence to a mental habit. As the "advantage" motive is renewed in post-war competition, this progresses to a mentally organised conviction, which reaches, first to the "suppressed", and ultimately to the "repressed" domains of the "unconscious" mind.

So much time was given over to the preparation of defence from gas attack that the soldier was deeply impressed with the potency of this weapon. Horrors were deliberately created that we now all know were entirely unjustified. While such may be warranted to promote application in training, it also, unfortunately, planted in the soldier's mind certain fears that I believe far out-weighed the usefulness of this training. The very means adopted to train the troops made them mentally less able to meet the conditions of modern warfare. I believe that easily 50 per cent. of the psycho-neuroses that developed amongst the soldiers near or at the front were due to what can be termed "gas hysteria". I saw many cases of psycho-neuroses develop during a so-called gas alarm. . . .

Among the medical problems of the ex-service man that still confront the Government one finds expression of this popular belief. Any lung condition, and no matter how remote from service connection, is still regarded by the layman as the result of gas.

² Thus Vedder (*Medical Aspects of Chemical Warfare*, p. 245), states that by 1925 300,000 American ex-soldiers had applied for war relief alleging "gas disability". The total American battle casualties were 224,089, of whom 70,552 (31.5 per cent.) were from "warfare gas". (*British Official Medical History, Vol. II, Diseases*, p. 497).

The figures for pension claims actually accepted were hardly less extraordinary.

In a paper on neuro-psychiatry in military medicine read before the Sixth International Congress on Military Medicine and Pharmacy June 1931, Professor Lorenz of Wisconsin University, U.S.A., said:

"45% of all the disabled veterans in the United States are cases of neuro-psychiatric disability"

"The present annual cost of veterans' relief in the United States is over Five Hundred Million Dollars per year. Easily 50% of this huge load is due to neuro-psychiatric disabilities that are connected or related, by legislation, if not in fact, to military service."

And in a paper at the same Congress Dr. P. S. Matz stated that:

"From 1917 to 1919 inclusive 78,930 men and women were discharged from the military service on account of some neuro-psychiatric disease; the latter constituted 25% of the total number of all of the men discharged from the service (313,200)."

All the papers presented at this Congress and the whole discussion on the subject are of the highest value and among the most weighty since the war.

In Great Britain whereas the "total of casualties from nervous disorder" on the Western Front is estimated at "about 80,000, which would include many recurring admissions" and the numbers from other theatres of war would be small, yet "even at the beginning of 1921 65,000 men were receiving pensions for 'neurasthenic disablement' . . . attributed to 'shell-shock'".

³ Extract from article by W. F. Lorenz, Professor of Neuro-psychiatry, University of Wisconsin, U.S.A., Col., M.C., U.S.R.—Published in the report of the Sixth International Congress of Medicine, held at The Hague, in 1931. See in this connection also *Chap. xvi.*

In an earlier part of this chapter there was given an account of the incidence at Gallipoli of the syndrome known first as Disordered Action of the Heart ("D.A.H.") and later as the "Effort Syndrome". It is not proposed to examine the origin and incidence of this condition in the A.I.F. at the front. Neither "D.A.H." itself nor other forms of neurosis associated with disorder of the neuro-chemical mechanism of the body—hyper-thyroidism, visceral neuroses (as peptic ulcer and so forth) are prominent in front-line records. But at the Intermediate Base (Command Depots) Disordered Action of the Heart presents itself as one of the most difficult administrative problems, and a brief note on it will be found later in this chapter.

A definite syndrome present at this phase of the war was that of "war weariness". The following gives the situation in France.

War weariness

It is stated that a number of men in the battalions who have rendered excellent service have become war worn and of little use to the battalion. These men are not cases for boarding on medical grounds. Other cases are sent for boarding by R.M.O.'s on the grounds of "mental weakness" with history of past epilepsy, dull intellect, etc., which cannot be dealt with on medical grounds. The unit commanders agree that these cases are of no use to them but they show no reason for sending them to the Base. . . .⁴

THE MAJOR PSYCHOSES

The Australian records do not contain material for a technical examination of the problem of major psychoses in the war⁵—partly because the Australian Medical Service had no responsibility in this matter except that of repatriating the patients. Of this process a com-

⁴ Diary of A.D.M.S. 2nd Aust. Div., 16 May 1918 (Col. A. E. Shepherd). For an account by Maj. Woollard of experience with this condition in the Command Depots see *Vol. II*, pp 462-3: for its post-war incidence see *Chap. xvi* of this present volume.

⁵ On 19 Oct 1917, the following nomenclature of mental diseases was adopted throughout the British Army "to be strictly adhered to": (1) Idiocy (variety to be stated); (2) Imbecility; (3) Feeble-mindedness, (4) Moral imbecility, (5) Mania (acute, intermittent, chronic); (6) Melancholia (acute, intermittent, chronic), (7) Maniacal—depressive—insanity; (8) Mental stupor, (9) Delusional insanity (acute or chronic), (10) Psychasthenia (obsessional insanity); (11) Acute delirium; (12) Insanity associated with acute infective disease; (13) General paralysis of the insane, (14) Confusional insanity (Synonym: exhaustion psychosis); (15) Insanity due to alcohol (acute or chronic), (16) Dementia praecox; (17) Dementia (primary or secondary).

plete account is given later. But a few aspects of the problem of the major psychoses must be briefly mentioned.

Psychosis or psycho-neurosis? The burning question—whether the distinction between psychosis and neurosis is one of *kind* or only of *degree*—was “in the air” even during the war. Yet despite the existence of undoubted “border-line” cases the distinction is as definite as—for example—that between “disease” and “wound”. For practical purposes some such distinction as that already made in this chapter—based on the presence or absence of insight or “awareness” seems adequate; it is not claimed that the discrimination is “scientific”.

It is useful to recall that the diagnosis between “true psychosis” and the accepted antithesis “psycho-neurosis” may cause diagnostic difficulties by reason both of a degree of psychopathic identity and of clinical similarity. The therapeutic test may be of help in diagnosis, as it is in discrimination from organic disease.⁶

Further, Australian psychiatrists noted the frequency with which states of mental confusion were met with in the field. Thus Lieut.-Colonel J. K. Adey (late superintendent at Royal Park Asylum, Melbourne, and formerly commander of the 5th Field Ambulance) wrote:

Insanity in any of its manifestations, with the exception of one form, was rarely met with during the war forward of the casualty clearing stations. The Psychotic as a general rule is not a good mixer. He does not willingly submit to discipline and his companions, particularly in camp life where men's peculiarities are more obvious than in civil occupations, soon discern that his mental state is abnormal. He is then relegated to the base or lines of communication until his conduct makes his return to Australia imperative.

The one exception is a temporary condition known to psychiatrists as Confusional Insanity and is due to extreme stress—as a heavy bombardment, long privation, or great emotional disturbance as in men who were buried by a shell blowing in their dugout. A patient in this condition of *Confusional Insanity* would show loss of attention, he would be unable to give a coherent account of himself, he would be unable to say what had happened, where he came from and sometimes was unable to state even his name and unit.

All degrees of this condition, from a mild temporary amnesia to complete disorientation, could be observed. The man would recover from temporary Confusional Insanity in 24 to 48 hours provided he was given some rest and food, and the majority of such cases would

⁶ Reference may be made to an article by Prof. W. S. Dawson, in the *Medical Journal of Australia*, 25 Apr 1931, and by Prof. Bostock, *M.J.A.*, 14 June, 1941.

never get beyond the casualty clearing stations. At Le Sars, in February 1917 the 5th Field Ambulance had a deep dugout free from noise and all external stimuli, where cases of this type were kept for 48 hours and then returned to their units.

It is not proposed—and is indeed denied by psychiatrists—that in “confusion” we have a pathogenic missing link between the two states, but the phenomenon seems worthy of attention.

THE AUSTRALIAN INTERMEDIATE BASE IN GREAT BRITAIN

The primary treatment of all A.I.F. casualties arriving in Great Britain depended on the British hospital system. This included the special treatment of all “psychic” cases.

From the excellent account by Lieut.-Colonel R. G. Rows⁷ in the *British Official History* it is evident that the neurological hospital system (which at first formed the basis of the organisation for the treatment of psycho-neuroses) was quickly mobilised. The provisions made were found, however, to be not only inadequate but unsuitable. Under stress of war and of unique and urgent problems a broad outlook was gained—not, it is clear from records, without much “dust and heat” of debate, professional and military—and a new organisation created. In effect, the system instituted by G.H.Q. France was carried through to Great Britain. “Neurological clearing and distributing hospitals” (such as the “Maudsley” and its dependent and Auxiliary Hospitals) were established in 1917-18, whence the various types of “psycho-neurotics” and “psychotics” were distributed to appropriate treatment centres. For psycho-neurotics the two centres best known to Australians were the “Red Cross Military Hospital” at Maghull, and the “Seale Hayne” Neurological Hospital at Newton Abbott.⁸ The outlook and methods in the various special hospitals differed considerably. Thus Seale Hayne (under Lieut.-Colonel Arthur Hurst) specialised in treatment at a

⁷ Col Rows was regarded by the Australian Medical Service with the highest admiration. He commanded the Maghull Hospital throughout the war. This officer, Col. A. Hurst, who was in charge of Seale Hayne, and Col. Thos. Lewis were “guide, philosopher and friend” to the Australian Medical Service in England.

⁸ At the time of the Armistice there were available 1,000 beds for officers and 5,000 for other ranks. From the Maudsley a total of 12,438 cases—“battle casualties” or “sick”—had been distributed.

more "superficial" level than was considered necessary at Maghull (Lieut.-Colonel Rows).⁹

A small proportion of Australian patients found their way to these. But even at the end of the war the system for discriminating the "neurotic" case (the psychotics were very exactly handled) and for shunting him to a special hospital was, almost inevitably, imperfect. Certainly almost all Australian patients went to ordinary General Hospitals from which they were later collected—"the last state (commonly) worse than the first"—with all possible speed to the Australian Auxiliary Hospital and Command Depot system, from which again, if not likely to be fit for return to duty within six months, they were despatched to Australia at the earliest possible opportunity by hospital ship or transport.

A complete account of the system built up for dealing with Australian casualties in England who were "returned to duty" in France has been given in *Chapter XVI* of *Volume II*; and the course of the "invalids" who were boarded for "return to Australia" will be described in *Chapter XIII* of the present volume. But a brief note on the problem presented by the special cases that are discussed in this chapter may be most conveniently given here.

The Australian Auxiliaries. Practice in the Australian Auxiliaries largely followed Maghull; in the Command Depots it followed chiefly Seale Hayne—in particular in rapid removal of symptoms by suggestion, light hypnosis, and so forth. But the "six months' policy" above referred to precluded any attempt to organise an Australian system for the treatment of the neuroses or of the psychoses in England. It may be conjectured that this had a—possibly material—effect on the final result, and thus on the pension commitments of Australia; for by the time such patients reached home they had, as Major Campbell in 1915 foresaw, been well and truly "hospitalised". Partly in an endeavour to remedy this, in 1918 Colonel J. W. Springthorpe was permitted by the D.M.S., A.I.F., to build up a small "neuroses clinic" at No. 3 Auxiliary, for the treatment

⁹ An admirable report to the D.M.S., A.I.F., by the Australian Consulting Physician, Col. Sir Henry Maudsley, on the work at Seale Hayne, is held in the Australian War Memorial

of men awaiting embarkation, but it cannot be said that the results achieved were striking. The atmosphere in which the treatment was carried out precluded any hope of success.

In the Command Depots. It was found that a great many men who should be fit for, at least, "B" class service did not get to the special hospitals, but were passed from the British General Hospitals, either direct or through Australian Auxiliaries, to the Command Depots for repatriation. In 1918 an effort was made by the A.D.M.S., A.I.F. Depots in U.K., Colonel McWhae, to do something more positive for the "neurotic" patients than merely let them await embarkation, and to supplement the treatment in British hospitals in the effort to "fit" a great proportion for "return to duty", as "A" or "B" class. To this end, on direction from him (and with the co-operation of General Howse and Colonel Hurst), an Australian medical officer with some specialist experience was posted for instruction at Seale Hayne, and applied the methods to cases in the Command Depots. The record of his results is of great interest, as almost invariably, in an impressive proportion of cases a "cure" is recorded.¹⁰ The ultimate result must be held problematical.

No single feature of psychiatric practice appeals to the intelligent philistine observer as being more worthy of thought than the ease with which, with appropriate technique, such results could apparently be obtained.

The important work done in the Depots was in the treatment of "D.A.H."; this has been referred to in *Volume II*,¹¹ and the technical aspect of the subject is examined presently. It cannot be said that, for the "moral and mental" disorders, the Depot system worked well. It did not. It may, indeed, be conjectured that this type of case—the moral and mental derelicts

¹⁰ Summary of 188 cases treated by Maj. J. B. Lewis in Monte Video Camp, No. 2 Australian Command Depot, Weymouth, between 11 Feb 1919 and 30 Apr. 1919, a period of 2½ months. Nearly all these cases were improved, and the vast majority cured:

Psychasthenia 49, Anaesthesia 1, Neuralgia 1, Hemiplegia 2, Insomnia 1, Neuritis 1, Tremor 1, Fits 1, Bell's paralysis 1, Tinnitus 1, St. Vitus' Dance 1, Rheumatism 34, Flaccid paralysis 3, Functional gastritis 2, Functional cough 1, Contractures of lower extremities 10, Contractures of upper extremities 27, Hysterical pain 15, Deafness 3, Aphonia 15, Speech defect 1, Stammerers 12, Diplopia 1, Spastic flat foot 1, Frequency of micturition 2, Functional writer's paralysis 1.

¹¹ *Chap. xvi.* An account of the results of observations by Col. H. Maudsley (Consulting Physician, A.I.F.) on the boarding of officers and men invalided to Australia is given in *Chap. xiii* of the present volume and in *Appendix 4*

—shared with the derelicts from physical battle—the “orthopaedics”—the worst results of the “six months’
Comment policy”. Effective treatment was delayed—and in the type of case with which this chapter is concerned delay might be, morally, “fatal”.

But the reader’s judgment should be reserved till he has had opportunity to “hear the other side”; and this he will find in *Chapters XIII—XV* of the present volume.

The disposal and treatment in England of insane soldiers of the A.I.F. was chiefly determined by the British arrangements.

The (major) psychoses The “insane” went to the asylums taken over by the War Office and staffed by British alienists drawn chiefly from officers of the Metropolitan Asylums Board. They were visited by officers of General Howse’s staff and of the Australian Red Cross Society, in the same way as other Australian patients in British hospitals.

Repatriation of insane soldiers. The repatriation of the mentally afflicted Australian soldier was a matter of great importance and yet of difficulty. It was obviously undesirable in the interests of the soldiers, their relatives, and the nation, that he should be retained indefinitely in England. In particular in the interests of his recovery it was greatly to be desired that his surroundings should be to him “normal”, which meant Australian. Yet the social difficulties inherent in the state of serious mental aberration, from whatever cause arising, made the problem a peculiarly complicated one. The way in which it was ultimately solved makes this episode one of the most admirable in the medical history of the A.I.F.

There were two factors in this successful achievement. The first was the decision by Surgeon-General Howse¹² that the “six months’ policy” should be applied strictly to these cases. He decided that it was undesirable to establish an Australian hospital for mental cases but that every effort should be made to get them home as quickly as was compatible with safety. In this last proviso, however, lay a problem which can be appreciated fully only by the initiated. It was solved through the genius of the officer selected by General Howse and en-

¹² See Vol. II, Chap. xxvi.

trusted with the arrangements for the repatriation of "mentals"—Major Pym (of the Lunacy Department of New South Wales). The details of the procedure are given later in the chapters dealing with the transport and repatriation of invalids.¹³ Here it is only necessary to note that the policy was implemented by:

- (1) extending Howse's general policy by concentrating mental patients in one or two British hospitals;
- (2) creating, within the machinery for the repatriation of these invalids, an exact system whereby mental patients (and other special types of cases such as "tubercular" and orthopaedic) were embarked on transports specially fitted and staffed for their accommodation and care. For mental cases these special arrangements were designed by Major Pym, who also selected and directed the special staff.

III

SOME PARTICULAR PSYCHIATRIC AND NEUROLOGICAL PROBLEMS

The past decade has seen a renewed *rapprochement* between physiology and psychology—even between neurology and psychiatry—as striking as was the clinical and scientific reaction in the second decade of the 20th century against the mechanistic outlook on mental disorder of the 19th, which had culminated in the neurological absurdity of "shell-shock". Speaking broadly, while the neurologists cry "forward!" and the psycho-analysts cry "back!" psychiatry, and the British school of psychiatry in particular (inspired as it is by the tradition of British medicine that the proper study of mankind is man, rather than artificially abstracted elements in his make-up) seems to be moving in the direction of a scientific integration of clinically identifiable syndromes *in terms of both philosophies*. It is a movement which (as has been noted elsewhere) Freud himself foresaw as inevitable. As Professor Carroll C. Pratt says¹⁴

**The somatic
(visceral)
neuroses**

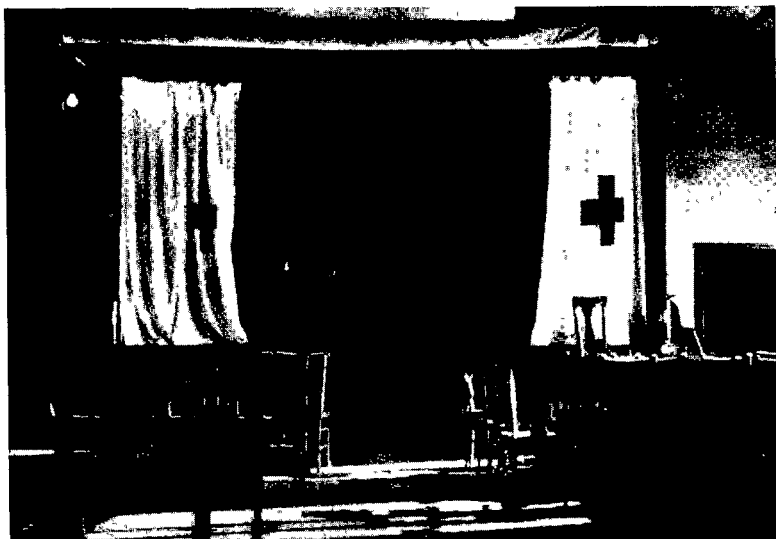
¹³ *Chaps. xiii and xiv.*

¹⁴ *The Logic of Modern Psychology*, p. 134. At p. 164 he adds: "Investigations that only a few years ago were regarded as pioneer efforts have already gone a long way toward moving a whole field of psychology over into physiology, or rather, fusing two relatively disparate fields into an indistinguishable whole."



4. The Main Building

*Photo from the Repatriation Commission
Aust War Memorial Collection No H12896.*



5. Concert Hall Moving Pictures are Given Twice Weekly. A
Billiard Room for the Patients is also Attached

*Photo from Director of Mental Hygiene, Victoria
Aust War Memorial Collection No H19421*

"BUNDOORA", HOSPITAL FOR THE CARE AND TREATMENT OF A.I.F.
MENTAL PATIENTS



6. THE AUSTRALIAN "DERMATOLOGICAL" HOSPITAL AT BULFORD,
ENGLAND

The view shows the main hutments

Aust War Memorial Official Photo. No D459



7. THE VENEREAL DISEASES HOSPITAL AT LANGWARRIN CAMP, IN
VICTORIA

The entrance, and a section of the huts.

*Photo lent by Department of Defence.
Aust. War Memorial Collection No A3662*

To face p 137

In proportion as the experimental work of psychology becomes exact, it will inevitably be absorbed into the more basic discipline of physiology. . . .

The lines of research that reach out toward this "far off divine event" are opening up in directions which the generation that was middle-aged in the First World War finds it difficult to apprehend.

The domain of medicine with which this chapter is concerned has become vast and specialised, and its boundaries are extending so rapidly that justice could only have been done to the subject by a team of specialists. Even within the restricted sphere which the writer has attempted to cover in a straightforward and "unsophisticated" narrative of a limited experience it has been necessary to restrict the subject matter within major spheres of military interest. It is, however, desirable here to complete the clinical picture by a brief reference to a few matters of less obvious military significance, though from the medical point of view they compose the actual "growing-point" of scientific advance. These comprise (1) genetically determined defects of conduct, the "abnormal" and the "subnormal" mind; (2) some "organic" and "functional" linkages; (3) the "visceral" or "somatic neuroses".

1. *Genetically determined Conduct Disorders.*

"Moral" *perversions*. The experience of the A.I.F. in these very important matters was slight, so far at least as records reveal. There is no evidence pointing to any significant homosexuality in the force, and this is on a par with Australian experience in general. The records of the A.I.F. therefore provide no contribution to the place of the homosexual in a total war effort.¹⁵

The moron in war. Nor has the Australian Imperial Force any positive contribution to make on the general problem of the wartime place of men with imperfectly-formed minds, or even of the scientific methods for their detection. The reason for this is the fact that the majority of men of inferior intellect either did not

¹⁵ As to this problem in other armies the reader may be referred to the *Sexual History of the War* edited by Magnus Hirschfeld. Though it contains some gross errors the authors of this unpleasant book seem to know what they are talking about.

present themselves for examination or were eliminated before or soon after enlistment. The conditions of social life in Australia made the detection of these men almost automatic. No attempt was made at a mental survey of the kind that caused the raising of the American Expeditionary Force to be an event in recruiting history. Whether the Australian force was worse off through the omission is doubtful; it seems improbable that, under the conditions of these examinations in Australia at least, any figures obtained could have been accurate, and the result might therefore have been misleading. Indeed it is acknowledged—somewhat naively—in the American statistical information as to “defects in drafted men” that as regards

neurasthenia, psychasthenia, and psycho-neuroses there is reason for thinking that most medical examiners did not sharply distinguish between these three diagnostic terms.¹⁶

2. *Some organic and functional linkages.*

Carbon-monoxide poisoning. The history of carbon-monoxide gas in the war is one of the most extraordinary in the whole gamut of war-medicine. Apart from its peculiar interest in connection with “tunnelling” and “mining” (already referred to in the chapter on chemical warfare) and as an unsolved problem in gas-defence, the symptoms caused by it—mental confusion; paresis and paralysis; par-aesthesia and anaesthesia; and amnesia, sometimes with sudden recovery of memory—seriously compete, according to Professor Frederick Mott and others, with blast from shell-burst as an explanation of the “cause” of “shell-shock”.

Drug addiction. True “drug addiction” was definitely rare in the A.I.F. Alcohol and, in some degree, tobacco were, like sex, some men’s only means of “flight from reality”. Without some such “hobby” not a few men would fall into fear and neurosis. But it is certain that they were bad substitutes for the creation of character (“sublimation”); and only too often created a “vicious circle”.¹⁷

¹⁶ From *Defects found in Drafted Men*, 1920, Department of Surgeon General, United States Army. The question would however, be materially elucidated by exact analysis, on comparative lines, of the men *discharged from the army for all causes*.

¹⁷ It is to be confessed that, curious to say in view of the potency of the drug, there is no evidence known to the writer to prove that any serious toxic effects were produced by the stupendous consumption of tobacco. Australian records throw no light on the question, which would seem worthy of more exact enquiry than it has received.

"Idiopathic" epilepsy. The medical records of the A.I.F. do not throw any readily discernible light on this still "mysterious" subject. "Fits" had a considerable "nuisance-value" in connection with recruiting and the elimination of "unfits". Their exclusion was found to be largely a matter of detecting "previous history" and of regimental action during training.

Later, as a problem of pensioning, this matter brought most difficult questions. These cannot be entered into here beyond saying (1) that A.I.F. experience points definitely to the desirability of excluding from the Army any man who is known to "throw fits" of any kind; (2) that pensions experience suggests the importance of a close liaison between the Pensions department and whatever department is concerned with recruiting.

General paralysis of the insane. The discovery just before the war in the "*spirochaeta pallida*" of a parasitic "cause" for a sickness, which was at once a clearly defined source of "mental disorder" and an organic disease of the brain identifiable at autopsy, gives this condition a place in psychiatry along with those of the epileptic, "concussion", and "Parkinson's syndrome", and with laceration of the frontal lobes. Australian records do not throw light on the pensioning aspect—the problem of attribution to or aggravation by war.

At the Interallied Sanitary Conference (1918)

While all agreed on the syphilitic origin of G.P.I. it was held debatable how far its onset might be influenced and perhaps its progress accelerated by "shell-shock", or by some injury of the head.¹⁸

Encephalitis lethargica. The psychogenic *rationale* of this dreadful sequel to infective disease of the brain, whereby, through some physical changes in the cerebral cortex, a saint may be transformed to a sinner, has yet to be elucidated. Its war-interest is contained in the fact that it was during the war years that the disease was first identified, and that cases occurred in the A.I.F. The *rationale* of the correlation between the "disease" and the "Parkinson syndrome" does not appear to have progressed since the *British Official Medical History* (*Pathology*, p. 567) said in 1922:

¹⁸ From the report of the Australian representative to the D.M.S., A.I.F.

in the wider view (the) disease results from the interaction of several factors of which changes in the vital and chemical properties of the tissue cells, on the one hand, and in the provoking stimulus or pathogenic agent, on the other, are the chief.

A.I.F. records show only 6 cases actually recorded, with 3 deaths. But in 1934 21 men were receiving pensions for *encephalitis lethargica*, 18 for "Parkinsonism" and 9 for "Parkinson's disease". It seems possible that even more cases occurred on service than is represented in this list. The condition is, indeed, a cogent argument for the principle of giving the sufferer "the benefit of the doubt" in pensioning.

3. *The somatic (visceral) neuroses.*

The concept contained in the term "somatic" (or "visceral") neurosis appears to have been first defined in British medicine by Professor Clifford Allbutt (1836-1925). It must be accredited as a major element in the progress of psychiatry—indeed of scientific medicine itself. It creates an intellectual link between "*psychology*" and "*pathology*", as do the disorders and diseases themselves between *psyche* and *soma*. The scientific vista which opens up can be viewed from either direction.

The importance of the war of 1914-18 in the evolution of this scientific concept derives chiefly from the prevalence of the clinical syndrome which for almost a century has had a place in military medicine as "The Soldier's Heart" and later "D.A.H." It is unnecessary to do more than fit the war of 1914-18 into the history of the "syndrome".

It may be recalled that functional disorder of the heart was prevalent in the Crimean War, and that it formed the subject of a classical study by Da Costa (1871) on the "irritable heart of the soldier" in the American Civil War. The condition officially diagnosed as "disordered action of the heart" was prevalent in the South African War of 1900-1902. It was described by Lieut.-Colonel R. J. S. Simpson (*Epidemiological Study*) as

associated with a general condition of increased irritability . . . of the vasometer system. . . . Their nervous system generally seemed out of order and they could not stand long without shaking all over. . . . In some patients the affection was constant though always increased by exertion, others were all right when at rest.

In the Great War of 1914-18 the condition came at once into prominence on the Western Front. Its place in the clinical picture of Gallipoli has been recorded. The "suggestive" content of the diagnosis "D.A.H." became a matter of military, as of medical, concern; and in May 1918 the term "effort syndrome" took its place—without any obvious benefit.

The scientific history of the "syndrome" in this war is contained in the well known studies of Thomas Lewis. The following statement of his own concept of "the effort syndrome" seems to give his views a scientific detachment not always accorded them:

The picture which I have here attempted, no final picture let me say at once, is in many ways a picture without a central motive to fix the attention; it is perhaps better that it should be painted so; for if the "effort syndrome" is regarded as due to a specific form of disease, the right attitude toward the individual patient is at once lost. That attitude is one of deferred judgment, an attitude of enquiry. . . . As time goes by the group begins to fall to pieces and the patients to rearrange themselves for diagnostic purposes.¹⁹

The clinical analysis of this "condition" by Lewis and recognition of the fact that the autonomic nervous system is a prime element in its pathogeny, links the First World War studies with those accepted to-day.²⁰

Apart from the Gallipoli experience recorded elsewhere the condition is not especially prominent in the medical or military history of the A.I.F. It was most in evidence **The experience of the A.I.F.** in the Command Depots, where (as recorded in *Volume II*, p. 463) a clear-cut attitude and system of treatment were adopted, which is commended as an authentic contribution to the study of the practical military problem.

An important field for prophylactic action at recruitment may perhaps also be indicated by recent observations that the recruit has often a suggestive personal history.

¹⁹ *The Soldier's Heart and the Effort Syndrome*, p. 8, 1918 Edn.

²⁰ Dr. Paul Wood (Physician to Effort Syndrome unit, E.M.S., London, *Proc Royal Soc. of Med.*, June, 1941) has urged, in a study of outstanding merit, "the rejection of all these" [various terms—such as Effort Syndrome], adding "nor do I feel morally bound to suggest a substitute, for I believe that the recognition of this syndrome as such will die". His summary and conclusion that "the symptoms and signs of Da Costa's Syndrome more closely resemble those of emotion, especially fear, than those of effort in the normal subject", coincide with views expressed by Maj. S. F. McDonald in 1920 ("The Neurotic Factors in D.A.H." *Trans. Australasian Med Congress*, p. 413).

IV

SOME "MORAL AND MENTAL LESSONS" OF THE WAR

The history of the problems of the moral and mental disorders of conduct as they appeared in Australia itself during the war and in the post-war period are examined—so far as possible—in the final chapters of this volume. But it is desirable that the war experience be linked with both the past and the future in a brief "appreciation" of its most important "lessons".

The sum total of medical observation on the "mental" phenomena of the war, and the consensus of informed medical opinion based upon it, appear strongly to favour the conviction that (1) the moral and mental disorders of behaviour met with in war are not *sui generis* but in their essential pathogeny and nature are identical with those met with in peace; but (2) that nevertheless, in their superficial and less fundamental attributes such disorders, and in particular those in which loss of "awareness" or "insight" is not a characteristic feature (*i.e.* the "psycho-neuroses"²¹), *do* exhibit a degree of specificity, both in their clinical syndromes, and also in their immediate pathogeny and course.

The recognition of these two facts, by the military command, the medical service, and the civil community, is essential to success in dealing with the problem presented by so-called "shell-shock" and other disorders of behaviour in and arising from war—which is indeed a vast problem both for the soldier and for the nation.

It would probably be no exaggeration to affirm that the medical "problem" of nervous breakdown—at least as seen in the Great War—is only 20 per cent. a war problem and 80 per cent. a problem of war's aftermath. The figures show this, but there are also more general grounds for the statement. In an army at war, given a reasonably effective use of the methods of prophylaxis developed from the experience of 1914-18, the place of the neuroses is not one of major importance. In 1914-18 the irreducible minimum of hopeless cases constituted certainly not

²¹ Prof. Millais Culpin (*Recent Advances in the Study of the Psychoneuroses*) has very rightly protested against the usage which associates the more clearly psychogenic disorders with the neuron ("neuroses"), and those diseases whose ultimate neurogenic origin is most obvious with the psyche ("psychoses").

more than 1 per cent. of the total non-battle casualties. Thus, despite its undoubted importance as a cause of casualties, nervous breakdown was infinitely less so than infection, and much less than physical "hardship".²²

When, however, we come to examine the incidence of "nervous" influences in the problems of pensioning we meet a startling—indeed a terrible—situation, and one that deeply concerns the medical service. The proportion of pensions for this type of disorder greatly exceeds the total sum of the disorder actually seen in war. And the gravity of the matter lies in this, that here no effective method has been evolved of preventing the degradation of *potential* neurosis into *actual* neurosis. It is not difficult to visualise the insidious onset of "unconscious malingering" in the conditions into which the existing social economy precipitated the civilised world in the "depression" of 1930. This development, which will be studied more exactly later emphasises the supreme need of *prevention* which takes the shape of the *creation of "character"*, individual and national.

The British Commission on Shell Shock laid down some broad principles which, in the opinion of the eminent soldiers, clinicians and scientists who composed it, were of first importance in the creation of a character capable of retaining the *psyche* unconquerable under the moral and mental strains of modern war. They rely largely on military and national traditions, together with the possibility of physical and moral ameliorations of the soldier's lot—in other words, on *esprit de corps*, discipline and organisation.

In Australia the counterpart of British Army tradition is what has been known since 1914-18 as the "Anzac" or "A.I.F. spirit". The following summary of it by a Queensland officer describes—in the case of the men he eulogises—a morale likely to be proof against most of the shocks of war and peace:

I was one of a mob. . . . When one gets close to rough chaps as some of these men were, one finds hidden qualities. All these men were wicked in the church sense. All had a keen sense of humour. A few reeled home drunk. One was particularly impressed with the fact that those of Irish descent loved most to scrap. . . . In sober moments all were friendly.

A "shock-proof" crowd

²² See statistical analysis in *Chap xvii*

The conversation at times was disgusting in the extreme. I learnt in course of time that the vilest men were the poorest soldiers.

One standard of honour was demanded. Each should do his fair share. All should play the game, one with the other.

There were many men in their early twenties and the average age ranged from 25 to 30 years. All sects, creeds and types were represented. Men came from Hobart, Launceston, Devonport and Burnie. They came from the coastal cities and towns between Lismore and Cairns, from the Darling Downs and from towns further west. Men came from Springsure, Emerald, Clermont, Barcaldine, Longreach, Winton, Cloncurry, Richmond, Hughenden and Charters Towers. Every trade, pursuit and profession was represented. There were farmers and farm labourers, graziers and their stockmen. Men from the outback came with us.

We lived together, learned each other's opinion and studied lives and types. Through years of campaigning we slept, dined, marched, fought, suffered together and spent holidays with one another.

Men of different habits and thought saw much in each other to love.

What could make men see eye to eye and work together harmoniously? It was every individual's desire to serve. As a volunteer he enlisted because he believed in the cause. He took care not to do or say anything that would cause offence to the sensibilities of others. He was tolerant. As a soldier he had determined to give of his best.

Nearly all the men had fine qualities, and I cannot imagine any body of men looking less like cut-throats. It was instinctive with most that they should help each other. Rarely did one meet men who would not work amicably with others.

There *were* men who deliberately avoided their obligations to their mates and who schemed so that they could shirk their duty. In wartime, men cannot hide their true character for long, and, fortunately, very few "pointers" were discovered. Then they were known throughout the company. Real soldiers were tolerant. They regarded pettiness as a big crime. Opinions were respected, tolerated, accepted for education, or rejected. Provided a man did his job to the best of his ability, he could express himself in the manner he pleased. . . .²³

Captain Toft headed that description "Playing a Man's Game", and in this connection, while fully recognising the importance of the scientific approach—through psychological research and tests—the present writer would also urge the traditional British method of natural and constructive observation and common sense—exemplified in the practice of field games in and after school life and in the objectives of the Physical Fitness Councils and "Playgrounds", "Recreation", "Leadership" and similar movements in all the States—always

²³ *Queensland Digger*, 1 Nov 1935, "Playing a Man's Game" by Capt. J. G. Toft, M.C., 15th Bn., A.I.F.

realising that the goal of social medicine is "the equalisation of all classes, rich and poor, in respect of health."²⁴

In the army the *prevention* of psychic breakdown in the normally constituted man is obviously far more important than the patching up of psychic misfits. From the military point of view the "ninety and nine just persons who need no repentance" are at least 99 times as important as the one who, by great expenditure of medical energy, may perhaps be rescued for some "B" or "C" class job behind the front.

Further, as mass-suggestion is discerned by most psychologists as an important element in the actual production of neurosis, it may be surmised that—with a definite and reasonably assessable residue of human material that is irrevocably psychopathic—the significance, speaking broadly, of psychic instability is just what we make it. This is true of any social circumstances or episode wherein men are subject in mass to special strains and stresses. It is emphatically true of war.

In concluding this account of moral and mental conduct in the Australians in the First World War it must be said

**Conclusion:
the meaning
of "moral"**

that the outstanding, and amazing, feature of modern warfare is the illustration it affords of the resilience, the power, the majesty of the human mind. This is not to say that abnormal mental factors did not enter profoundly into the war picture. But that no-man's land of conduct and behaviour that is called "unusual" or "anti-social" or "undisciplined"—with all the mental, physiological, and physical commotions and changes that underlie it—which both divides and links the "normal" and the "abnormal" in mental order, was, in the First World War, a very wide one. Though, in the last resort, it was the task of the medical service to distinguish those "syndromes" of conduct and behaviour that would qualify or unfit a man for military service, yet—at least in the Australian force—it was not chiefly in the domain of disease, but on the plane of ordinary "soldierly conduct", of "playing the game", and of "self-help" in the daily rough-and-tumble of life, that mind and body fought with Apollyon in the Valley of the Shadow of

²⁴ *Brit. Med. Jour.*, 19 Aug. 1935, quoting Dr. Etienne Burnet, of Paris.

Death, both during the war and in its hardly less terrible aftermath of economic struggle.²⁵

STATISTICS OF MENTAL DISORDERS IN THE A.I.F.

The records of the A.I.F. do not permit the presentation of an exact and complete analysis of the "moral and mental" disorders that caused men of the A.I.F. to become "casualties" on the Western Front or in the war as a whole. An endeavour is however made in *Chapter XVII* to trace the incidence of these disorders, in a systematic fashion, from the recruiting centres in Australia, through the vicissitudes of active service to the aftermath of repatriation and pensioning.

A SELECTION OF BOOKS

- AUSTRALASIAN MEDICAL CONGRESS—*Proceedings*, 1911, 1914, 1920.
 BERRY, Prof. R. J. A. *Brain and Mind, or The Nervous System of Man*. New York: Macmillan. 1928.
 BLONDEL, C. *The Troubled Conscience and the Insane Mind*. London: Kegan Paul. Psyche Series. 1928.
 BROWN, Prof. Wm. *Suggestion and Mental Analysis*. University of London Press. 1922.
 BURT, Prof. C. *The Subnormal Mind*. Oxford University Press. 1935.
 BUZZARD, Prof. E. Farquhar. *An Outline of Neurology and Its Outlook*. Oxford University Press. 1929.
 CANNON, Prof. W. B. *Bodily Changes in Pain, Hunger, Fear, and Rage*. New York: Appleton. 1915 (Quoted in *The Oxford Medicine*, Vol. I: and elsewhere).
 CHRISTIAN, Prof. H. A., and MACKENZIE, Sir J. (Edited by). *The Oxford Medicine*, Vol. VI, *Diseases of the Central Nervous System*. Oxford University Press. 1921.
 COLE, R. H., *Mental Diseases*. University of London Press. 1919.
 CRILE, G. *Diseases Peculiar to Civilized Man*. New York: Macmillan. 1934.
 CULPIN, Prof. M. *Medicine: And the Man*. London: Kegan Paul. Psyche Series. 1927. *Recent Advances in the Study of the Psychoneuroses*. London: Churchill. 1931.
 DEVINE, H. *Recent Advances in Psychiatry*. London: Churchill. 1929.
 GARRISON, Fielding H. *History of Medicine*, 4th Edn. Philadelphia and London: W. B. Saunders Company. 1929.
 HART, Bernard. *The Psychology of Insanity*. 3rd Edn. Cambridge University Press. 1921.
 HERBERT, A. P. *The Secret Battle*. London: Methuen and Co. 1919.
 HOWE, E. G. *Motives and Mechanisms of the Mind*. London: The Lancet Ltd. 1931.
 HURST, A. F. *Medical Diseases of the War*. London: Arnold. 1917.
 HURST, C. C. *Heredity and the Ascent of Man*. Cambridge University Press. 1935.

²⁵ This truth has been most brilliantly stated by the artist and poet Will Dyson in the dedication ("To the Men of the A.I.F.") to his book *Australia at War—a winter record* made by Will Dyson on the Somme and at Ypres during the campaigns of 1916 and 1917. (London: Cecil Palmer and Hayward. First Edition 1918)

- INTERALLIED SANITARY CONFERENCES, Paris, 1917-18-19—*Reports*.
- INTERNATIONAL CONGRESS (Sixth) OF MILITARY MEDICINE AND PHARMACY. The Hague, 1931. *Official Report*.
- JONES, E. (Edited by). *Psycho-Analysis and the War Neuroses*. London: International Psycho-Analysis Library. 1921.
- JONES, Prof. F. Wood and PORTEUS, S. D. *The Matrix of the Mind*. London: Arnold. 1929.
- LEWIS, Prof. Sir Thomas. *The Soldier's Heart and the Effort Syndrome*. London: Shaw and Sons. 1918.
- MCDUGALL, Prof. Wm. *Psycho-Analysis and Social Psychology*. London: Methuen. 1936. *An Introduction to Social Psychology*. 17th Edn. London: Methuen. 1922.
- MIGNON, Med. Insp.-Gén. *Le Service de Santé, 1914-18*. Paris: Masson et Cie. 1927.
- MILLER, E. (Edited by). *The Neuroses in War*. London: Macmillan. 1940.
- MITCHELL, G. D. *Soldier in Battle*. Sydney: Angus and Robertson. 1940.
- MORRIS, Prof. A. *Criminology*. London: Longmans, Green. 1934.
- MOTT, Sir F. W. *War Neuroses and Shell Shock*. Oxford Medical Publications. 1919.
- MYERS, C. S. *Shell Shock in France, 1914-18*. Cambridge University Press. 1940.
- OFFICIAL MEDICAL HISTORIES OF THE WAR—British (*Diseases, Vol. II*); Canadian (Prof. Sir Andrew Macphail); New Zealand (A. D. Carbery); American (*Defects found in Drafted Men, Statistical Information*; and *Vol. X—Neuropsychiatry*); German (*Sanitätsbericht, Band III*).
- OSLER, Prof. Sir Wm. *Principles and Practice of Medicine*. New York: Appleton, 1912.
- PRATT, Prof. Carroll C. *The Logic of Modern Psychology*. New York: Macmillan. 1939.
- RIVERS, W. H. R. *Instinct and the Unconscious*. Cambridge University Press. 1920.
- ROSS, T. A. *Lectures on War Neuroses*. London: Arnold. 1941.
- ROUSSY, G. and LHERMITTE, J. *The Psychoneuroses of War*. Edited for the War Office, by Col. W. A. Turner. University of London Press: 1918.
- SAVILL, T. D. *A System of Clinical Medicine*. 2nd Edn. London: Arnold. 1909.
- SHERRINGTON, Prof. Sir Charles. *The Brain and Its Mechanism*. Cambridge University Press. 1933.
- SMITH, Prof. G. Elliot and PEAR, T. H. *Shell Shock and Its Lessons*. 2nd Edn. Manchester University Press. 1918.
- TROTTER, Prof. Wilfred. *Instincts of the Herd in Peace and War*. 1916. *Collected Papers*. Oxford University Press. 1941.
- WAR OFFICE COMMITTEE. *Enquiry into Shell Shock*. London: H.M. Stationery Office. 1922.
- WATSON, Prof. J. B. and MCDUGALL, Prof. Wm. *The Battle of Behaviourism*. London: Kegan Paul. Psyche Series. 1928. Debate between Watson and McDougall.
- YEALLAND, L. R. *Hysterical Disorders of Warfare*. London: Macmillan. 1918.

CHAPTER III

THE VENEREAL DISEASES IN THE WAR OF 1914-18

THERE is no alleviation of the sufferings of mankind, except veracity of thought and action and the resolute facing of the world as it is. (T. H. Huxley.)

Man has not yet become physiologically adapted to his social state: the good of the family indicates one course of conduct, man's constitution compels another. It is an evidence of progress that, as a community, we place the benefit of the family before the desires and comfort of the individual; but doing this, we are placed in the dilemma that the performance of physiological function, save under the aegis of monogamic marriage, becomes regarded as anti-social. . . . And as the sense of social duty is a plant of slow growth . . . it has followed that the whole matter of sexual conduct has for generations been surrounded with an atmosphere of insincerity, not to say hypocrisy. . . . It is the knowledge of this insincerity, which in the past has permeated the whole treatment of the matter, that makes it so difficult for most of us to take up the public discussion! (J. G. Adami.)¹

Of feeding, breathing, reproduction, and social intercourse the four prime organic compulsions in the human life-process of which advantage is taken by parasitic micro-organisms to make entry into his body—there remain only to be examined in the A.I.F. the several types of infection conveyed through *the reproductive act*.

Venereal disease was a cause of medical concern in the war, and is a subject of study in its medical history, in three main aspects. First, as it influences the achieving of victory; second, as it menaced national health and the national *amour propre*; third, as a scientific problem in preventive and clinical medicine. And in this chapter the individual, humanitarian, religious, social, and philosophic aspects of the subject can be touched upon only in so far as they affect these three interests. In accordance with the policy adopted in this work clinical problems are not dealt with.

¹ Col J. G. Adami, F.R.S., C.A.M.C., sometime Strathcona Professor of Pathology and Bacteriology at McGill University, Montreal, *British Medical Journal*, 25 Jan. 1918, p. 98. At the outbreak of the war Professor Adami was made responsible for the historical records of the C.A.M.C. He died on 29 August 1926.

The "V.D." problem in the A.I.F. presents itself in five clear-cut phases: in Egypt, 1914-15; in Egypt, 1916-19; in the United Kingdom, 1916-19; on the Western Front, 1916-19; and in Australia throughout the war. The first two have received attention in *Volume I*.

**General review
of the problem**

This chapter therefore deals with the remaining three and is particularly concerned with (a) the prevention of infection and disease; (b) the treatment of diseased men and their disposal; (c) the military and national consequences of these diseases.

The facts and figures concerning V.D. in the war might be presented in the form of statistical tables and military orders: it is quite impossible to *study* the subject without "appreciating" all the factors involved whose resultant is the curve of incidence of the diseases. The importance of the matter requires that such study be attempted.

Evolutionary factors. The quaint coincidence that two or three denizens of the parasitic underworld should have evolved their life-history on the mechanism of the reproductive function in man,² and that his own social evolution has prescribed that the details

**Factors in
the problem**

of the sexual process shall be subject to rigid socio-religious control and treated as a "mystery", has brought many embarrassments. One of the most serious is a conflict, in medical sociology, between reason and fetish which, in Australia, until the Great War, kept this terrible group of diseases almost wholly outside the scope of the new science of preventive medicine and thereby involved civilised man in unnecessary physical degradation and his women-folk and children in much needless misery and suffering. These same taboos at the outset of the war of 1914-18 imposed on the troops of the British Empire, and in particular those of the dominions, unnecessary

² That man should be specially selected for this exploitation is curious. "Surra" disease of the horse seems the only reflection of the venereal diseases of man in the a-moral sphere of the lower animals. In the A.I.F. venereal disease contracted otherwise than in the sexual act was very rare. The immense trouble caused by gonorrhoeal ophthalmia in Napoleon's campaign in Egypt, had no reflection in this war. At the same time, the attitude that would restrict the pathogenic outlook in gonorrhoea and syphilis to the most obvious mode of transmission by the act of coition cannot be too strongly condemned. Epidemics of gonorrhoea in Children's Hospitals, an ever-present menace, illuminate the problem of the pathogenesis. In parts of Arabia syphilis (as "Bejel") is not a sexual disease, but an extra-genital disease of children which having got a hold in that stage of the social life-cycle of its host, is maintained by successive generations of children through their habits at that particular stage (See *British Med Jour.* 12 June, 1937, pp 1219-20).

impediments in meeting a well-known menace, and on the medical services a needless aggravation of a sufficiently difficult task.

The diseases. We are concerned with three conditions, syphilis, gonorrhoea, and chancroid.³ Clinically these are distinct, each requiring a special and elaborate technique. In the Army, as in civil life, they demanded, as will be seen later, special organisation and arrangements. But though the parasites responsible for these diseases differ morphologically by all that sunders the vegetable from the animal world, the diseases form a clearly defined group in that they have a common obligatory host in man and the higher apes, and a common technique of attack and habitual mode of entry to the host.⁴ None of the three diseases concerned is immediately fatal, nor are their clinical effects such as to prevent or seriously to inhibit the sexual act, repetition of which after infection is the essential factor in the continued existence of each of the species. Another element in the success of the two most important, gonorrhoea and syphilis, which they share in common with other parasites—such as those of tuberculosis, leprosy, trypanosomiasis, and malaria—is the fact that the reaction induced in the host tends to chronicity in the resulting “disease” and to a condition closely allied to the carrier state; for this reason the problem of prophylaxis becomes a matter not of days or weeks, but of months or years.

Important from the strictly military point of view—which was not greatly concerned with the infectivity of the soldier—is the fact that little or no immunity is conferred save by a continued state of “disease”.⁵

The disease subject. Momentous as are these biological

³ Venereal warts, condolomata and so forth, not being specific, are shown in the table in this volume among “V.D. unspecified”. Clinically and pathologically the knowledge of these diseases in 1914 was little less complete than to-day 606 was discovered by Ehrlich in 1910 but was only procurable in Germany. The researches that brought substitutes—novarsono-billon, etc—do not call for particular mention. Such technical refinements as the identification of the spirochete of syphilis by the dark ground illumination, and detection of gonococcus infection by the complement deviation method, were known and practised before 1914.

⁴ The fact that syphilis becomes generalised had little influence in the Army on the problem of infection. The infected towel of the gonorrhoeal case and mug of the syphilitic were both held responsible for occasional cases in the A.I.F.

⁵ Even in gonorrhoea it is doubtful whether the parasite can be “carried” without some pathogenic effect. The delegates to the Interallied Sanitary Conference in 1918 were shown by Dr. Paul Vernes (whose succession to Fournier as world authority on syphilis was prophesied at the time by the French delegates) syphilitics who had been cured by his therapeutic campaign controlled by complement deviation, and who had returned with a typical hard chancre. In gonorrhoea reinfection and relapse were important factors in the military problem.

factors in the problem, they are not perhaps the most important ones. The chance of success in life of these lowly parasites has been immensely increased by the evolution in their host of a system of social restrictions, especially, perhaps, of those automatically consequent upon the co-existence of wealth and poverty. Thus evolved the "prostitute class"—one of the major medical problems of the war.

The social and "moral" aspects of the problem of "wastage" from venereal disease were of very great practical importance and are an essential part of the medical history of the war. The medical problem of "disease"—its nature, its manifestations, its prevention—is bound up with the very stuff and texture of human life—the as yet mysterious physio-chemical state of matter that enshrouds while it makes manifest the "soul" of man.⁶

The study of the problems of disease here leads into domains of human experience governed by laws that have only an indirect relation with those that control those *changes in living matter*, with the aberrations of which medicine is chiefly concerned. Though public health and public morality are not identical their relative significance may be a matter of time and circumstance. It was no mere freak of imagination that led Samuel Butler to conceive the idea of transposing the sources of sympathy and revulsion respectively, by making the people of "Erewhon" attach to unsound bodies the idea of "sinfulness", associated by us with unsocial acts, and making the social delinquent the subject of sympathetic public and personal prophylaxis. The endeavour to repress diseases by attaching to them the stigma that with us follows the punishment for commission of a crime is not foreign to experience. In the Great War, in respect of the important group of transmissible diseases with which this chapter is concerned this transposition did, in fact, occur. Men's fear of infection led them, while condoning the running of the risk, to condemn as a pariah the man who contracted the disease.⁷

As the war progressed the achieving of victory became the

⁶ "Thus at the roaring Loom of Time I ply,
And weave for God the Garment thou seest Him by."
(The Earth-Spirit in *Faust*, from Carlyle's *Sartor Resartus*).

⁷ Certain skin infestations associated with V D under the term "dermatological" disease, in particular scabies, were the subject of a like transposition, but one less dramatic because the chief factors in their transmission, promiscuity and filthiness, were inherent in the performance of patriotic duties at the front.

supreme goal to the greater part of mankind; it furnished a moral incentive, in the light of which all other "moralities"—the sanctity of human life, the restrictions that safeguard sexual relations, even the moral value of Truth itself—were assessed. Whether we like the idea or not, and whether or not it was helpful to the real cause of the nation, the fact remains that many women, not inherently "abandoned", surrendered themselves partly in the belief that the loosening of sexual relations promoted the winning of the war, or was, in a way, a patriotic act. In every national army the most striking feature of the V.D. problem in the War, was the rise to prominence of the "amateur" prostitute.⁸ Curiously enough the anti-social character of the *venereal diseases* incurred in such "*abandon*", and the obloquy attaching to them, became accentuated, on the ground that they were subversive to victory and inimical to national interests, rather than "immoral".

Such was the background against which there was made the very remarkable experiment undertaken by the D.M.S.,

**Howse's plan
of action**

A.I.F., General Howse, in the interests of the Army and the Australian nation in the prevention or abortion of venereal disease in the A.I.F. in Europe during 1916-19. In considering this it is necessary in the first place to face the truth that in none of the forces from the dominions, serving overseas, far from their homes, of which figures are available, was the proportion of admissions to hospital for venereal treatment less than 100 to every 1000 soldiers.⁹ And (assuming that the bases of the statistics are comparable, which is doubtful) the rate in the Australian force was among the highest.

Two broad lines of action presented themselves: to minimise either the number of exposures to contagion or the risks involved in such exposure. On the first principle were based (1) official military action which endeavoured to reduce exposure by making infection a "crime", and by exposing the moral "sin" by

**Lines of
action**

⁸ This was emphasised by practically every national representative at the Inter-allied Sanitary Conferences of 1918 and 1919.

⁹ It is probable that the number was considerably greater. Figures are available for Canada, Australia and New Zealand. It can be stated with assurance that the experience of the South African force did not differ materially from that of the others. The proportion of men infected was not necessarily so high since the same man may have been admitted several times.

publicity—a kind of prophylactic blackmail; and (2) all the action that could be taken by the Army authorities to promote *morale* and morals, including the efforts by all means to sublimate to higher ends this prodigious motive power in human life, or to provide other activities for it. On the second was built up the vast campaign of medical prophylaxis and “preventive treatment”—of males in the army and of females in the civil community.

Military measures. By the time the A.I.F. was transferred to Europe the requirements of prevention, disposal and treatment were well known to its medical administrators, and the broad lines of the policy pursued in the force during the latter part of the war had already been laid down. The first line of action taken by the Australian Command and Commonwealth Government was to embody in Australian Finance and Allowance Regulations a special military order dated 1st February 1915, which laid down that “No pay will be issued while abroad for any period of absence from duty on account of venereal disease”.¹⁰ Concealment of V.D. was already a “crime” (under *King’s Regulations 462* and Section II of the *Army Act*).

The punishment was a fierce one indeed and was made the more severe by the provision that the pay allotted by the soldier to his family was also forfeit, and must be made up after his recovery before he could touch his own. The forfeiture was entered in his pay book. This process involved, in the soldier’s mind, the possibility of his “fall” becoming known to his people in Australia, and was a greater source of anxiety to him than the loss of pay. It consequently resulted in a heavy “loss” of pay books, until the authorities adopted a mode of entry which concealed the cause of the forfeiture. As punishment for a military “crime” the incidence of this order was very unfair. Cases of gonorrhoea which, because of the local nature of the treatment, were retained

¹⁰ Though the intention of this order was clear, namely, the permanent forfeiture of all pay while in hospital, the wording of the regulation was obscure. In December, 1916, General Howse urged that its intention be made clear. A.I.F. Order of 15 Dec., 1916, did this and it was made applicable to commissioned officers. From this date all members of the A.I.F. forfeited pay while in hospital suffering from V.D., officers also forfeiting field allowance. At the end of 1917 it was ruled that disease contracted prior to enlistment, or hereditary and certified to as such by the D.M.S., A.I.F., would not entail forfeiture of pay. Stoppage of pay for venereal disease was not provided for in the British Army.

in hospital till well—that is for a period of seldom less than six weeks—were heavily penalised as compared with cases of syphilis, which after a few days' treatment in hospital went to military convalescent camps where the stoppage ceased. The stoppage of *all* pay brought great hardship to those who had made large allotments. Whatever may be the ethical and military justification for and value of the provision and its influence on Army wastage—all of which is very difficult to ascertain—its effect on the individual soldier was intense embitterment. On the initiative of the British officer commanding a venereal hospital in France, the British Adjutant-General early in 1918 pointed this out to General Birdwood, on whose advice the Commonwealth Government agreed that from 1st January 1918, stoppage of pay for V.D. should be 2/6 a day with loss of field allowance for officers while off duty. This decision brought the A.I.F. into line with British procedure.

The influence of "moral" factors in limiting the amount of venereal disease is very difficult to assess—though there is no question of the paramount and urgent need for its limitation; but what may be said with certainty is that, despite striking exceptions, the higher the *morale* of a unit the less V.D. there was in it. It would indeed be difficult to refute the contention that this was the most potent of all the influences availed of or available. V.D. in the Army was pre-eminently a disease of leave-time, and to dominion troops "leave" did not mean "home leave". This point was emphasised by the Australian representative at the Interallied Sanitary Conference of 1917, and was accepted by the Conference as cogent. It is indeed impossible to exaggerate the importance and value of the efforts of the people of Britain to make their country "a home from home" for the dominion soldiers, or official activities of A.I.F. Headquarters in London when, perhaps somewhat tardily, the importance of such action was recognised. But, except so far as they concerned the convalescent, all these were outside the direct responsibility of the medical service.¹¹

¹¹ The admirable work done in Egypt by the Red Cross and Y.M.C.A., under the initiative of Lieut.-Col. J. W. Barrett has been referred to in *Vol. I*. The efforts of Y.M.C.A., Comforts Fund, Red Cross and of many British men and women demanded not less the thanks of the medical profession than the gratitude of the soldiers and their nation.

The attempt made in 1917 to reduce venereal disease by a campaign of lectures by a chaplain in the Command Depots and among the units in France was probably worse than useless. Neither the chaplain nor his addresses were such as to impress Australian soldiers; and, though some medical officers co-operated, no good results are reflected in the returns. Nor should this be a matter for surprise; with Australians under such conditions it is not the church parade and the sermon that counts but the example of their leaders, chaplains and others, and most of all the home influence and the instinct of cleanliness ingrained there. The thousands of Australian soldiers who did not bow the knee to Baal were far more influenced by ideals of clean living and loyalty to their "people" in Australia than by fear.

In civil communities the line of attack on venereal disease depends in great measure on the national attitude as to the ethics of the matter. But the A.I.F. in Great Britain at least, was free to work out its own salvation unimpeded by considerations other than those of military efficiency. When, early in 1916, General Howse took stock of the situation, he was assured of the confidence of the combatant command of the A.I.F. and of a free hand from Australia. He hated intensely V.D. in all its bearings—as he did alcohol;¹² but on this as on all other aspects of the problem of *promoting military efficiency*, and *saving the national purse*, Howse's outlook was wholly objective and pragmatic as to both methods and means. He had not been impressed by the practical results obtained in Cairo by moral efforts and social activities—such as they were¹³—and by education in the risks of incontinence and results of disease unless these were combined with active measures to ensure that men who might expose themselves to infection should take such steps to protect themselves as should be done on contact with any other kind of contagion. There were good grounds for this impression; and his reaction against punitive measures determined the D.M.S. to exploit the procedure of regulating and protecting the sexual act. He left it, perhaps unduly, to the

**The medical
campaign**

¹² General Howse was a rigid teetotaller

¹³ In some directions they were wise and vigorous but organisation by units themselves and their commanders was much too slight

chaplains, the Y.M.C.A. and similar departments to develop methods of moral suasion and the provision of ethical counter-attractions.

There were ready to hand all the requirements for an intense campaign for prevention and treatment. For direct preventive measures the organisation of A.I.F. Headquarters in London and of the depots in U.K. were available; for treatment the A.D.H. placed in his hand an admirable instrument. In Egypt before the Australians came to France and their base organisations to England, Howse had in hand an exact scheme of prophylaxis, drawn up by Colonel George Raffan, an officer of the A.D.H., whom he attached to his own staff as special adviser and supervisor in the campaign. The hospital itself could not leave Egypt till later in the year.

In the United Kingdom General Howse had a free hand, and within the scope of the civil law could make what experiments he wished. The formations in France, on the other hand, were wholly outside his jurisdiction; and, in this as in other matters, he was punctilious in observing his position. Indeed the problem in England and France differed fundamentally: the incidence of V.D. in A.I.F. troops in France did not greatly exceed that among the British, whereas in Great Britain it was approximately four times as great. It was, as has been mentioned, a disease of "leave", and to an overwhelming extent the problem of the A.I.F. now centred on leave to London, just as in Egypt it had centred on the troops' leisure in Cairo.

Prophylactic campaign. On his arrival in Britain General Howse found a system of personal prophylaxis already built up in the A.I.F. there during 1915 under the D.D.M.S. Surgeon-General Williams. On this, as was his practice, he built up his own scheme, which he based on two centres—(1) Administrative Headquarters, Horseferry Road, to which all men on leave from France, or on furlough after convalescence in British hospitals, had to report; and (2) the depots where, under the Australian Commandant, the A.D.M.S. had full control.

The nature of the campaign cannot be better described

than in a general review of the preventive measures taken against venereal disease in the Australian Imperial Force given by the Australian representative to the Interallied Sanitary Conference in 1918:

As early as 1916 it was evident that the circumstances were special, owing to the fact that some hundreds of thousands of men in the prime of life have been brought 12,000 miles from their homes, and kept there for several years under conditions of great restraint and frequently of great danger and hardship, with occasional intermissions of leave with money to spend and no home ties, and few restraining influences. The Australian at home is not a loose-living man; but it was obvious that very systematic and definite measures would be required to avert a serious interference, by venereal disease, with military efficiency and also danger to the future of the race.

The Medical Military Authorities were confronted with the alternative of a heavy and uncontrolled incidence of disease, or of making use of every known method whereby it could be checked. It was recognised that the possibility must be faced that the actual amount of illicit intercourse might thereby tend to be increased, and that there was a risk also of initiating a certain number into the knowledge of methods which later might be used to prevent conception—undoubtedly a serious matter in a country like Australia, whose vital need is population. But the urgency of the necessity for strong action to prevent disease became so evident, that it was decided that some risk must be faced, utilising at the same time every means, moral, social and educative, to prevent harm resulting from increased knowledge which might be gained.

The following is a brief account of the measures adopted in Australian troops in England:

1. *Policy.* (a) An educational campaign is carried out. (b) Prophylaxis is adopted and definitely advocated. (c) A system of "abortive" treatment of early cases is maintained. (d) A special hospital is provided for developed cases.

2. *Organisation and Administrative Measures designed to carry out the policy.*

A. Officers.—(i) An expert on early treatment of venereal disease is detailed to organise and control the system. (ii) There are attached to units and Command Depots medical officers on whose keenness and knowledge the success of the scheme depends. They are made as efficient as possible by:

(a) Clinical lectures and demonstrations at regular intervals in the various abortive methods of treatment; (b) constant supervision by the A.D.M.S. of the efficiency of early treatment methods in the lines; (c) the issue to all medical officers concerned of exact and detailed instructions; (d) ensuring that medical officers not only know their duties thoroughly, but carry them out. This is ensured by the weekly rendition by all medical officers responsible for early treatment of a precise report on their work (on a form known as *A.I.F. Form 587*)

B. Early Treatment Orderlies.—One or more of the A.A.M.C. personnel in each Command Depot and Training Unit are specially trained in the prophylaxis usually called "early treatment" of venereal disease, and

also in abortive treatment. They are responsible for carrying it out under the supervision of the medical officer.

C. Instructions to Soldiers.—(a) All soldiers on leave from France, or reporting at Administrative Headquarters from hospital, are paraded before the medical officer at the "Early Treatment" Depot for instructions.

(b) No soldier in the United Kingdom Commands can proceed on leave without reporting to the M.O. for instructions. C.O.'s cannot recommend or approve leave unless the leave application has been initialled by the medical officer.

(c) Every soldier reporting to a unit in England is paraded within 24 hours to the M.O. In training units the R.M.O.'s keep a nominal roll of soldiers on leave with the dates on which they are due back. If they are not paraded before the R.M.O. on these dates the C.O. of the unit is communicated with.

(d) Closest co-operation is required between combatant and medical officers.

3. Details of Working of the Scheme.

A. Nature of Instruction given:—(i) During the first week in each month a lecture is given by the medical officer to all ranks; which includes, with an account of the diseases and the measures for their prevention, a denunciation of the idea that continence is ever harmful, or that incontinence is an essential attribute of manliness; and also a warning of the danger of alcoholic over-indulgence.

(ii) Before proceeding on leave, men are specially warned of the risk of infection, are offered prophylactic outfits free of charge and, if wished, can purchase condoms.

(iii) They are given a card of advice and instructed to attend with the least possible delay for prophylaxis at an "Early Treatment" centre if they have run risk.

(iv) As regards abortive treatment, when signs of the disease appear, the chief points brought out in lectures and instructions are:—(a) That if a soldier reports for abortive treatment within 12 hours of the first sign of gonorrhoea, a cure is guaranteed within a week in 86 per cent. (or if he reports within 6 hours in over 90 per cent.) of cases that are proved by microscopic examination to be gonorrhoea; and that the sooner he reports, the more likely the treatment is to be successful. (b) That a soldier has everything to gain and nothing to lose by reporting for abortive treatment, as in the time (not exceeding eight days) during which he is retained in the lines for this treatment, he loses no pay, and his name is not taken for the purpose of record.

B. The System of prophylaxis, i.e. treatment where no signs are present.

(i) Condom or prophylactic outfit is provided.

(ii) "Early Treatment" Depots are established.

"Early Treatment" Depots have been designated "Blue Light Depots". At night a blue light shows their position in every unit lines, and at Administrative Headquarters, London. No names or questions regarding identity are asked; the Depots are open day and night.

C. System of "Abortive" Treatment, i.e. treatment when definite signs of disease are present.

- (i) *For Gonorrhoea*. Three methods are in use: (a) Sealing up. (b) Massage. (c) Plugging.

For all these a silver salt (the best being Argyrol), and a Glycerine of B. Naphthol (Benetol) are used as anterior injections, whilst Pot. Permang. is used as a posterior irrigation. The guiding principle is to *use as weak strengths as possible, and as few applications as possible consistent with efficiency*. Each case is judged alone according to the degree of tenderness present and the irritation produced. The strengths used are: silver salt, about 5 per cent., Benetol 1/60 to 1/150, and Pot. Permang. 1/8,000. The microscope controls diagnosis and cure.

(ii) *Syphilis and Chancroid*. Nothing but a saline dressing is applied to any lesion, whether abrasion or chancre, so that a microscope examination can be made without delay and without interference with its value by antiseptic applications. The demonstration of the causal organism allows of a definite diagnosis being made in many cases where clinically there is no final evidence, and frequently saves a delay of weeks in commencing the so-called "abortive" treatment of syphilis for which early action is essential. A chancroid in the early stage is likewise very amenable to treatment

This outline presents the bare bones of an organisation which, reflected as it was in some respects¹⁴ in every army, had by 1918 become a prominent feature of war life. The base of the Australian scheme was tripodal—the soldier, the woman, and the medical service. Its environment was the military structure of the A.I.F. in U.K. and the socio-political structure of Great Britain. Howse's instruction to Australian medical officers was:

**The scheme
in action**

The success or failure of the campaign depends mainly on the zeal and efficiency of the M.O. and the spirit in which he carries out instructions, comprised in the return (*A.I.F. Form 587*). It is the efficient and energetic man behind the machine who gets the good results. A great opportunity is offered you to reduce the casualties from a preventable cause. Seek to impart the same enthusiasm amongst all your associates, both combatant officers and N.C.O.'s particularly. Your C.O. will give you valuable assistance if you convince him of your earnestness.

Medical officers and orderlies concerned in this thankless task did their duty loyally and with initiative and insight. The following is a précis of the lecture which medical officers were required to give to the officers and men of their units once in each month:

Education

A. Denunciation of the idea that Continence is ever Harmful and that Incontinence is an Essential Attribute of Manliness

Many of you have probably heard that it is somehow or other harm-

¹⁴ Especially there were differences in the matter of abortive treatment of gonorrhoea. The practice in other armies is touched on later in this chapter.

ful to the physical well-being to refrain from indulging in sexual intercourse. From the medical point of view, that statement is absolutely false. Physically there is no necessity for it, and good health is not injured by avoiding sexual intercourse. A false mental need for sexual gratification may be wrongly created by the mind dwelling constantly on sexual matters, by stimulating the imagination. Therefore, avoid unhealthy literature, obscene pictures, sexual conversation and association with street-walkers. The finest and healthiest man is he who is master of his passions, not their slave. Such a man, at any rate, will not suffer the penalties associated with venereal disease. Some of you who take the risk without *exactly* carrying out the instructions and advice to prevent V.D. certainly will.

B. The Contributory Effect of Alcoholic Indulgence by Diminishing Self-Control.

A man who drinks *more than is good for him* is more liable to contract venereal disease than a man who keeps sober. Once a man loses his self-control ever so slightly, he is likely to be tempted, and probably falls a prey to some prostitute who is almost certain to be diseased. . . .

C. Description of Gonorrhoea, Syphilis and Chancroid, with their Complications, Sequelae and Effects on the Offspring. (Here followed a description of Gonorrhoea, Syphilis and Chancroid). . . .

D. Insistence on the Need of Prophylaxis and Early Treatment and the Danger of Concealment and the Use of Quack Remedies.

You now understand why so much trouble is taken to impress on you the advisability of taking proper precautions should you take the risk of infection. No woman who will allow you to have irregular sexual intercourse can be regarded as safe. She has probably granted the same favour to others. The amateur, no matter how clean looking, is just as dangerous as the regular prostitute. The street-walkers of Leicester Square, Horseferry Road, Waterloo, and the Strand neighbourhoods, etc., are nearly all infected, and the same thing applies to any large towns you may visit. . . . If you are unfortunate enough to get venereal disease, or even if you have the slightest suspicion that you have it, *do not under any circumstances conceal the fact*. Report at once to your medical officer. If it is early gonorrhoea, you will be admitted to the "Blue Light" hut, and treated up to eight days without loss of pay—a great and valuable concession, for if you have reported immediately after noticing the first sign or symptom, a cure is practically guaranteed. *Every hour's delay in reporting is dangerous.* . . .

E. Description of the Methods of Prophylaxis and Early Treatment at "Blue Light" Depots.

Now listen carefully to the means available to prevent venereal disease.

French Letters. . . . (Described).

The "Blue Label" Outfit. . . . (Described).

You are advised also to report to a "Blue Light" Depot in addition. This is frequently necessary, for under the stress of circumstances you may not have been able to carry out *exactly* the method of using the outfit and within the time limit laid down. However, do the best you can, and don't be shy of hurting anybody's feelings by using the "Blue Light" Outfit. Probably more than your feelings will be hurt if you don't.

You must if possible report *within 12 hours after the first connection*. The sooner the better. A delay of 12 hours may be fatal. If you can't come within 12 hours come as soon as you can. An arrangement has been made with the Canadian and New Zealand army authorities whereby all "Blue Light" Depots in training camps or in London are freely open to all Australian soldiers. You will be welcomed and treated at the Canadian Depot in Southampton St., off the Strand, and at the New Zealand Depot near Russell Square. The "Blue Light" Depots established in every unit's lines and at Headquarters, London, have saved thousands of men from getting venereal disease.

Early treatment of venereal disease is available for all dominion troops at any of the British camps, barracks, and military hospitals throughout Great Britain and Ireland. If out of London ask any military policeman to direct you to the nearest camp, barracks or military hospital, where you can get early treatment.

F. The Importance of each man keeping fit from the point of view of Military Efficiency.

At this critical period, the Empire can ill afford to lose a man from disease that is preventable. For the sake of Australian womanhood and the welfare and happiness of the Commonwealth, keep your bodies and minds pure, for venereal disease is the great destroyer of national and individual happiness.

The attitude of man towards the problem of this disease has recalled his earliest plea: "The woman tempted me and I did eat." Whether or not as a biological fact the parasitic germs of venereal disease first harboured in the female sex, on woman has always been laid by man the blame for maintaining through the ages the continuity of these diseases. The gynaecologist and paediatrist might demur, and even commonsense suggest that the supply of women available for "illicit" indulgence by the promiscuous minded male is created by the demand and by social conditions. But until the War the "prostitute" class has always been held to be the almost exclusive source of these diseases.

However this may be, it is certain that in the British Armies in the Great War *at first* the problem of V.D. was the problem of the prostitute. Both in Britain and France the crux of the problem of venereal prophylaxis lay in the national attitude towards sex, sex-diseases, and prostitution. These were antithetic. In Britain the attitude was that popularly ascribed to the ostrich: both subjects were taboo—V.D. was not supposed to exist save in "Lock" hospitals.¹⁵ The mischief

¹⁵ An eminent London surgeon in 1897 refused to accept as his junior a man who specialised in these diseases

was that the same taboo was extended to preventive medicine. Since the bitter campaign which brought the repeal of the *Contagious Diseases Acts* which permitted in India the registration and control of prostitutes, no legislation whatever was permitted in Britain.¹⁶ Prostitution and solicitation were open and unashamed. The public had become accustomed to the importunity, reaching almost to violence, of women equipped with every device that experience and the struggle for existence could suggest. The complacency with which this circumstance was regarded astounded medical officers from overseas. The dominion soldier on leave in London, with money to burn and without particular purpose save to obliterate the past and to forget the future, found awaiting him a ready opportunity to do so.

The introduction in Britain of conscription, and the pressure from the medical service and dominion Governments, (which, however, in their own countries, were **British reforms** equally controlled by the prudery of voters) compelled a change from this *laissez-faire*. In May, 1916, the War Office authorised the establishment of "Early Treatment" centres in all Commands. The dominions, faced with the more urgent problem, "went the whole hog" and authorised prophylaxis as well.¹⁷ Civil legislation was introduced which prohibited offensive solicitation of soldiers and initiated a campaign of free treatment for civilians. At a series of Imperial Conferences on "Temptation to Dominion Troops"

¹⁶ In Queensland prostitutes were registered and systematically examined and treated for gonorrhoea and syphilis. There can be no doubt that the chief factor in the detestation of the *C.D. Acts* was the one-sided attitude that placed on the female sex the whole onus of maintaining the public health in this type of disease.

¹⁷ A battle royal waged round the use of the terms "prophylaxis" and "early treatment". In the Australian force *prophylactic treatment* was used to signify the employment of drugs or appliances before exposure to infection: *early treatment* to the measures applied immediately after exposure to contagion to prevent infection: *abortive treatment* (*gonorrhoea*) to the special technique of treatment applied immediately on the appearance of symptoms, with a view to aborting the disease. By the British authorities "early treatment" was held free from any moral stigma, "prophylaxis" to involve the deliberate intention to the commission of an act which in the civil code was a "sin" and on the military might lead to "crime" i.e. the contraction of V.D. In the British Commands "Blue Light" Depots were established but prophylactic outfits were not permitted. The Australian authorities detected no moral difference, ethical or hygienic, between issuing to a soldier an "outfit" which he might use himself before exposure to contagion, and providing him with well advertised facilities for disinfection immediately after such exposure. To many this appeared no more immoral than to furnish a doctor with a finger-stall used for a p.v. or an antiseptic after it. That the personal possession of an outfit might have a psychological influence not contained in the knowledge of the existence of a "Blue Light" Depot was accepted, but it was held would be offset by the advice not to make its use necessary.

the shortcomings of the British "authorities" were pressed by dominion representatives with hysterical emphasis.

The curious emotional frame of mind engendered by *amour propre*, ignorance and fear, in relation to these diseases, is well seen in the report to the D.M.S., A.I.F. of the proceedings of a conference on venereal disease held at the Colonial Office on 19th July 1918.

**Imperial
conference on
venereal disease**

Mr. Walter Long (Chairman) asked Sir George Cave (Home Secretary) to address the Conference.

Sir George Cave referred to legislation already enacted:

(1) "That it was a punishable offence for a woman to solicit soldiers, if such solicitation *caused annoyance*." Already several convictions were on record and he hoped for a great improvement in public morality as a result of this legislation.

(2) "Women known to be prostitutes could be removed from the vicinity of the camp where they were a source of danger." This was a big help and had already been beneficial.

(3) Further legislation is in the embryonic stage, which, it is hoped will be of some assistance, and he asked for suggestions and ideas for consideration to help the authorities in framing new legislation.

The Canadian Political Representative had much to say regarding the promises and hopes of the last Conference, and that nothing effective had been accomplished. He wished to know whether any additional steps were being actually taken, and if so, what were they. The segregation and treatment of infected women was referred to, but no practical solution offered. Great emphasis was laid on *something must be done*—and that the Canadian Government would never send another army for another war if they thought the troops would be subjected again to the same risks of disease.

Mr. Walter Long asked for information to determine whether V.D. had increased or decreased since the war commenced, and what was the relative incidence of V.D. in civilian and military circles.

D.G.M.S. stated that in 1913 the V.D. percentage in the British Army was 5.3 per cent., whereas now it was little over 2 per cent. Several members discussed the question of civilian *v.* military, and it was agreed that civilians were more diseased than soldiers.

Mr. Ian Macpherson (Under Secretary of State for War) stated that it was the intention of the Colonial Office to further the establishment of Early Treatment Clinics amongst soldiers, and in towns frequented by soldiers. It was not intended to advocate the use of prophylactics before connection. He further stated that General Pershing intended to place all *maisons tolérées* in France "out of bounds" for American troops. At present only those at ports of disembarkation are "out of bounds".

Mr. Massey, N.Z. hoped that his countrymen would never be degraded by the adoption of any system of prophylaxis. He spoke with great

emphasis on the necessity of doing all that is possible to prevent the spread of V.D. and the downfall of the Empire.

Sir Joseph Ward, N.Z. hoped that the C.D. Act would never be revived. He wished to be reassured by some announcement of the Government that everything possible is being done to protect the troops, as the people in New Zealand are very disturbed and have expressed considerable anxiety about sending their sons to face the risks of destruction through venereal disease.

Lieut.-Colonel Raffan (representing the D.M.S., A.I.F.) in reference to the removal of prostitutes from the vicinity of the camps—stated that the women were merely caused to travel from one camp area to another, and not eliminated as a source of infection.

The Conference closed without any satisfactory solution being offered or arrived at, and agreed that much is to be hoped for from past and future legislation.

The picture conjured up by the politician of hordes of female harpies in wait to exploit for gain the simple lads from overseas can only be excused by the strong emotion engendered by the subject, the circumstances of the war, ignorance of the facts and the desire to throw the blame on someone else. Venereal disease, as statistics show, was not more prevalent in Britain than in the dominions.

The technique of the anti-V.D. campaign in the A.I.F. was changed from time to time, but only in matters of detail.

Course of campaign in the A.I.F.

At the end of 1917 Colonel Raffan returned to his unit, but he was recalled at the beginning of 1918 on account of the increase in the incidence of the disease following an initial improvement. In May he was sent to France to advise on prophylaxis in the Australian formations and in Paris.

The two officers chiefly concerned in the campaign, Colonel McWhae, A.D.M.S., A.I.F. Depots in U.K., and Colonel

Among A.I.F. in England

Raffan, have summarised results as follows. After stating that the pressure of urgent events in 1916 held up to some extent the campaign at the Command Depots, Colonel McWhae says:

From March 1917 onwards abortive and prophylactic treatment was organised in all units, and the preventive methods were thoroughly carried out. During the year following the commencement of "Early Treatment", the number of patients in hospital was lessened by practically one-third . . . from 2,047 in January-March 1917 (3.66 per cent. of strength), to 1,168 (or 2.8 per cent.) in January-June 1918 . . . but during the last six months of 1918 the number in hospital practically returned to its original percentage. It is therefore hard to form an accurate idea

of the exact extent to which the measures were successful in combating the disease. During nineteen months ending December 1918—

235,277 soldiers went on leave from A.I.F. Depots.

171,277 cards of instruction were accepted.

142,609 prophylactic outfits were accepted.

168,563 attended for prophylactic treatment.

12,128 attended for abortive treatment.

8,173 were reported as cured after showing signs of disease.

In order to control the results of the (abortive) treatment (of gonorrhoea) more accurately, in August, 1918, all abortive treatment of relapses was prohibited, and soldiers who had finished abortive treatment were kept under observation for a further period of nine days, being examined on the third, sixth and ninth days after stoppage of treatment. A record of the results was kept on cards. In October, 1918, 1,459 of these early treatment cards were scrutinised with the following results:—

(1) In 102, repeated microscopical examination showed no gonococci. 95 were discharged to lines cured. 7 were admitted to hospital for treatment.

(2) In 481 cases, gonococci were found in the discharge, of whom 332, i.e. 69 per cent., were discharged to lines cured. 149, i.e. 31 per cent., were admitted to hospital for treatment of V.D.

(3) 640 cases were not microscopically examined. 472 (74 per cent.) were discharged to lines cured. 168 (26 per cent.) were admitted to hospital for treatment.

Thus it would appear that approximately 70 per cent. of proved gonorrhoea cases were aborted.

Though medical officers concerned and able to judge were convinced that a large amount of disease was prevented in those that incurred the risk, it cannot be said that, taken as a whole, the results were such as should determine a precedent. As Colonel McWhae wrote:

Despite these measures which were carried out by medical officers and orderlies with wholehearted enthusiasm, V.D. maintained a comparatively large hold on A.I.F. troops.

The following table shows the percentage of venereal disease among the A.I.F. in England from 18th January 1917, until 7th March 1918.

Period	Average Percentage of Soldiers in Hospital.
From 18.1.17 to 15. 2.17	3.7 per cent.
From 22.2.17 to 15. 3.17	3.62 per cent.
From 22.3.17 to 31.12.17	2.6 per cent.
From 3.1.18 to 7. 3.18	2.34 per cent.

A contemporary note on these figures says:

The percentages shown above are not absolute. The strength of

troops in depots in U.K. is taken only, whereas the patients in hospital include soldiers of the Australian Flying Corps, attached to British units, soldiers on furlough from hospital and soldiers on leave from France, who do not receive organised instruction similar to the troops from A.I.F. Depots in the United Kingdom, amongst whom the present incidence is well under 2 per cent.

An account of the A.I.F. campaign given by Colonel Raffan to the members of the British Demobilisation (Infectious Diseases) Committee, 27th February 1919, is recorded as follows:

In London from August, 1916, to February, 1919, 222,882 attendances were recorded at the London Early Preventive Treatment Depot. For a period of six months the average weekly attendances in the United Kingdom (18 E.P.T. Depots) was 4,823. The average monthly admissions in the U.K. for three months in 1918 were June 1,667 (6.07 per thousand), July 975 (5.84 per thousand) August 1,063 (6.27 per thousand). In the earlier part of the war the admission rate had been nearly double—about 130 per thousand per annum.

It was hardly possible to judge the effect of any single one of these combined measures [the campaign as described]. He [Colonel Raffan] believed that without these measures V.D. would be enormously greater, but how far the numbers were kept down by prophylactic measures, by early preventive treatment, or by abortive treatment, it was impossible to say. Although the results of prophylaxis did not show a very marked diminution in the number of hospital cases, he thought the methods were of value because the number of men attending the Blue Light Depots had greatly increased, and the number exposed to risk was probably much larger. Men were now more reckless. Where, by accident, in France a unit arrived in a town before the Blue Light Depot had been set up, there was an immediate increase in V.D., and the rate was markedly higher where prophylactic methods were not well organised. "Amateur" infections had been greater than professional, but the Australians' view of what was a "professional" was rather uncertain, and of late more came from this class.

Before turning to the special hospitals and treatment the course of the anti-V.D. campaign in the A.I.F. in France must be touched on. There the situation in respect of venereal prophylaxis reflected the objective and realistic outlook of the French people on matters of sex.¹⁸ The French system of prophylaxis was based on the "*maisons tolérées*", and on the belief that regular inspection and treatment would greatly diminish, if not abolish, the risks of infection from the

¹⁸ In Dr. Paul Vernes' Clinic, syphilitic patients, male and female, were in the same waiting room and discussed their problems without restraint. Gonorrhoea cases were regarded differently by Frenchmen. In its case the sexes were segregated as being real "venereals".

registered women. In the B.E.F. inspection was carried out after identification by the soldier of the woman by whom he became infected. It may be said at once that, from the point of view of the A.I.F., the results of this system were far better than those secured under the *laissez-faire* outlook of Britain. Certainly over the whole period under review, of cases treated in France, by far the greater number caught the disease in England.¹⁹

There were, however, two very weak spots in the French system. First (as acknowledged by the French representative at the Interallied Sanitary Conference) gonorrhoea in the female could not be detected with certainty, and even when detected was exceedingly difficult to "cure". Second, it was seldom that an Australian soldier could be induced to "give away" the woman,—even though informed of the fact that she would be subject to no hardship thereby and given the best treatment.

Maisons tolérées were not out of bounds to troops of the B.E.F. as they were (despite strong objection from French authorities) to the troops of U.S.A. Infection of men of the A.I.F. in France was insignificant until late in 1916, when Amiens became the social centre of leave for troops of the B.E.F. in the Somme area. The Australian divisions were in the midst of the extreme trials caused by wintering in the mud of the battlefield. How acute the problem became can be judged by a letter from Major E. R. Cordner, No. 51 General Hospital, to Colonel Victor Hurley, of Howse's staff, dated 6th January 1917:

A.I.F. practice in France What I wished to speak of was this and I want you of course to treat this letter as entirely private and confidential and not in any way official. We have noticed here a remarkable number of cases coming in from Amiens especially among Australian troops and nearly all of them are gonorrhoeal in origin. Really the incidence from there has been appalling. One sits at the table seeing the cases and asks where the patient got the disease and the answer is again and again repeated—Amiens. It seems from the men's stories that they get leave and go into Amiens and then come back and pass on to their pals the addresses of the houses where they have had connection. Their pals follow and each gets V.D. of some description.

I might tell you that when I came here from No. 18 General Hospital

¹⁹ It should be remembered, however, that Australians had little leave in France except occasionally to Paris and, during some periods, in considerable numbers to Amiens (See in this connection also *p.* 172.)

the number of patients (including those transferred from there) was roughly 1,000, whereas at the end of December the number was over 1,600. In other words an increase of over 600 in 5 weeks, of whom nearly half came from Amiens; and of these 600 practically all were Australians. The hospital has orders to increase to 2,000, and it seems that we will increase beyond that also, for the cases are still rolling in. The men seem to think it is their duty to get V.D. They really consider it a joke altogether and laugh and rag one another about it.

I am enclosing to you a statement issued by the hospital to the M.O's here, and I am sending it with the permission of the O.C., but on the distinct understanding that I am not writing officially but simply to bring to your notice things which may not yet have reached you and that may be of some use.

I am very interested in the treatment of the diseases; but it seems very little use when there is no attempt to get at the cause, for we shall soon be swamped and it will be just a case then of routine work with no chance of special work.

And another thing, if I am not boring you—we do not get the cases until 8-10 days after the disease is recognised. Every day beyond 3 after the disease comes out puts about half a week on to the treatment.

But I suppose I am giving you stuff that you know all about already; but I feel it very strongly, and it makes one sick to see 1,200 Australian venereals to 400 British venereals when one knows that this base is perhaps the biggest British base in France. . . .

From February onwards special steps were deemed necessary on account of the supposed undue proportion of Australians reporting with V.D. This was done by cutting leave in units that showed more than $\frac{1}{2}$ per cent. of venereal cases in any one week, and stopping for six months the leave of any man infected. "Blue Light" Depots were established and prophylactic treatment given in the units. This system was continued throughout the war and at the beginning of 1918 was organised by Colonel Raffan as adviser to the D.M.S. The nature of the trouble there is shown in a monthly report of Major D. M. Embelton on V.D. in the 2nd Division in March, 1918:

187 cases during the month as against 82 the previous month. Steps are being taken in the battalions to educate the men about V.D., its dangers and prevention, but so far have not proved its value. Blue Light rooms are available in all units, but most V.D. is contracted on leave which has been liberally given.²⁰

The problem of Paris leave, one of the most talked of features of the V.D. problem but one of the least important so far as the A.I.F. was concerned, calls for mention only to

²⁰ Discharged patients were often retained in casualty clearing stations as stretcher-bearers.

record the admirable work done there by the representative of the Canadian force, Captain Walker, C.A.M.C.²¹

In France, V.D. cases when convalescent from hospital or from the forward areas were frequently used as stretcher-bearers but for reasons of discipline and treatment the system was troublesome.²²

In England, until the end of 1915, A.I.F. patients were sent to the various British V.D. Hospitals. Early in 1916 the "Great Peter Street Convalescent Depot" was equipped and staffed to work with the British unit at Dean Street, which was staffed by eminent British specialists. Some admirable work was done in this improvised unit exploiting, particularly in gonorrhoea, the *vis medicatrix naturae*. It was also here that, for a short time, there was initiated one of the two successful experiments in "social" treatment that are referred to later in describing social measures.

But on the arrival of A.I.F. Headquarters from Egypt General Howse decided that the conditions were unsuitable, and arranged for members of the A.I.F. to be admitted to the British hospital at Bulford, on Salisbury Plain. In August, 1916, the Australian Dermatological Hospital from Egypt, having disposed of 1,200 venereals left behind by the Australians there, arrived and took over Bulford on Salisbury Plain. A full equipment of instruments and appliances required for the specialist treatment of these conditions on modern lines was provided by the Australian Red Cross Society. Thenceforward every case of V.D. in the A.I.F. that occurred in or was sent

²¹ Colonel Raffan noted on 12 August 1918:

"Paris Area. The organisations in Paris to care for the soldier on leave are excellent. The four large residential hotels including Y.M.C.A. hostel are attractive and well patronised.

"E.T. Depots are established at the Caserne de la Pépinière and at the residential hotels including the Y.M.C.A. building. Captain Walker, a Canadian M.O. supervises the medical arrangements, and also talks to all men passing through the barracks, about the dangers of acquiring V.D., etc. He is doing excellent work for the A.I.F. men on leave and is gratified by the manner in which Australians pay heed to his advice by reporting for prophylaxis.

"Elaborate arrangements are made in Paris whereby soldiers on leave can spend their leave to the best advantage. Daily excursions in Paris and its neighbourhood, Versailles, etc. are arranged. Each party is personally conducted by a lady guide from the Y.M.C.A. hostel." The work of Miss Ettie Rout for the troops has been much criticised but was a real help to many.

²² In September, 1917, discharged V.D. patients were being used at No. 1 A.C.C.S. as stretcher-bearers. On 24 November 1917, the O.C., No. 2 A.C.C.S. noted the men attached doing very good work and their condition improving. In January, 1918, 56 convalescent V.D.'s reported for treatment and duty as general duty orderlies. In February, 1918, 90 V.D. convalescents were attached to No. 2.

to Britain, including those in whom "abortive treatment" in the Early Treatment Depots had failed, was sent here.

The Australian Dermatological Hospital. The history of the "A.D.H." reflects the banal tragedy and social cruelty that surrounds venereal disease. Only to the initiated few does "Bulford" conjure a picture of scientific enthusiasm, earnest endeavour and clinical work of conspicuously high standard.

And it must be confessed that the forlorn and unhopeful outlook, imposed on these hospitals by social custom in civil life and continued in the war, was not relieved in this A.I.F. unit by any obvious sympathetic consideration from A.I.F. Headquarters. Neither the difficulties of clinical treatment, nor the already sufficient disabilities imposed upon the patients by the nature of their disease appear to have been realised there. Admirably staffed in Australia, the unit, when in Europe became to a considerable extent the unhappy dumping ground for the disciplinary posting of medical officers and other ranks regardless of their special qualifications. The C.O. was chosen by seniority in the service and took no part in the technical work. Like the bulk of the profession, Gen. Howse held (rightly or wrongly) that the specialists in venereal disease brought to the treatment, in particular of gonorrhoea, refinements of technique that had little reflection in clinical advantage over simpler methods. It must be said that these refinements were perhaps unduly exploited. A criterion of cure (*e.g.* of chronic "gleet") was set that was higher than in civil life, and the duration of treatment prolonged thereby.²³

The establishment of the hospital is shown elsewhere (*Volume II, pp. 829 and 911*). The unit was originally established in 1915 with 100 beds. When it was transferred to Bulford (*Volume II, Map p. 452*) it took over as a "going concern" premises used for the same purpose by the R.A.M.C. In July, 1917, additional huts were erected, the War Diary for the month recording—"on March 28th the establishment was raised to that of a General Hospital of 1,040 beds. The original establishment being quite inadequate for the 1,200 patients then under treatment".

It was organised in three sections, with separate provision in each for officers and other ranks: (*a*) acute gonorrhoea, syphilis and scabies; (*b*) complicated cases of gonorrhoea; (*c*) chancroid, and all cases of disciplinary detention.

An indication of the work of the unit can be obtained from figures given at the end of the chapter.

²³ It is but right to point out that this matter of "cure" had other involvements than military wastage. A curious feature of V.D. in the war was the *pariah* attitude of men which went so far as refusal on board ship to use a common urinal. The military standard of cure, as laid down by the War Office, took full account of the factor of infectiveness.

Clinical methods. It is unnecessary to say more on this matter than that every feature of diagnosis and treatment known at the time was exploited here. The development of abortive treatment was peculiar to the Australian Service. Results useful to military efficiency were secured by it, but where it failed or relapse occurred the subsequent treatment was made more difficult and sequelae in the form of stricture seem to have been more common. As put by an officer "from the military point of view it was 'O.K.', from the clinical '*pas bon*' ". In the unit itself the treatment of acute gonorrhoea was standardised and from the beginning of 1918 was put under direct charge of the officer in command of the technical division, who advised the O.C. regarding the introduction of experimental lines of treatment by juniors.

The Convalescent Training Depot. Perhaps the most important constructive innovation was the scheme started in May, 1917, for combining treatment and training by transfer to a special depot at Parkhouse to receive, treat and train syphilitic patients. After July, this was applied also to men with gonorrhoea. The purpose in the latter case (says a report) was to interpose a test of training before return to duty. Patients in this depot carried out their training in the usual way, and the stoppage of pay therefore ceased on transfer to the depot, which was under combatant command. The average number in the depot was 388, and in 18 months ending December, 1918, 3,865 syphilitic and 3,889 gonorrhoea cases passed through. During the 12 months ended June, 1918, the medical officer in charge gave 14,867 intravenous injections of novarsenobillon. Practice made the officer and his team of four A.A.M.C. orderlies very expert, and with six tables in operation they would average 100 injections per hour, and 120, and sometimes much higher numbers were reached.

Military offenders. Military offenders with venereal diseases caused vast trouble at Bulford until the arrangement was made for their transfer to a wing of the Lewes Detention Barracks, where an Australian medical staff was installed and a ward equipped. Each six months approximately 200 cases of gonorrhoea, 90 of syphilis, and 130 of scabies were treated here.

Until July, 1917, A.I.F. venereals were treated without demur in No. 39 British General (V.D.) Hospital at Havre.

At that date 46 per cent. of the total patients under treatment in that unit were Australians.

Treatment in France

In August the accommodation available for V.D. in France was overtaxed—there were 6,100 beds for 8,028 patients and Sir Douglas Haig, with the concurrence of

General Birdwood, asked that an Australian V.D. Hospital be established. General Howse had the staff, but properly demurred to the cases being housed, as was proposed, in bell-tents. Instead four Australian medical officers were attached for duty to Nos. 51 and 39 British General (V.D.) Hospitals. In May, 1918, the question of a special Australian unit was again raised by Haig's Adjutant-General; but this time the personnel was not available. Howse, therefore, proposed the transfer of Australian cases to Bulford, but this conflicted with the British policy of retaining all V.D.'s in France. Accordingly a wing of No. 39 was staffed by Australian medical officers. This again proved a failure. Treatment at a V.D. Hospital necessarily involved problems of discipline, and, for good discipline Australians required Australian officers. The Australian idea of discipline, admirably suited for fighting, did not lend itself readily either to the prevention or the treatment of V.D. Ultimately in December, 1918, Howse had his way, and V.D.'s from France went to Bulford.

The following table shows the source of infection of all Australian cases reporting in France during the four weeks ending 30th December 1916. During this period short leave to Amiens was being very freely given (*See Vol. II, Chap. v.*)

United Kingdom. ²⁴					France.				
London	..	..	..	210	Amiens	..	..	..	277
Rest of England	..	..	..	291	Rest of France	..	..	..	283
Scotland	..	..	..	47					
Ireland	..	..	..	19					
Total	..	..	..	567	Total	..	..	..	560

One of the vast changes in the social life of European peoples that followed the Great War²⁵ was a changed outlook on sex among the British peoples. In this reaction from prudery there may have been elements—perhaps passing ones—threatening the safety of the social structure, but there can be no question

**"Social"
measures**

²⁴ The men who contracted the disease in France were drawn from the whole A.I.F.; those in U.K. from the comparatively small number of men "on leave". The relative distribution of the three diseases were:—Syphilis 10.66 per cent. Gonorrhoea 68.25 per cent. Other V.D. and N.Y.D. 21.09 per cent. In connection with the last it is of interest to note that *non-venereal* urethritis was not uncommon.

²⁵ The philosophic and social history of the war in its entirety and of its results is still to be written and it is one for which the times and the manners are ripe. Books like *Brave New World* have not the historic foundation studies like *All Quiet*, *Good-bye to All That* or Hirschfeld's *Sexual History* give glimpses only.

but that in the sphere of preventive medicine the result was wholly beneficial: in Australia, at least, a rational outlook and a scientific public health legislation resulted largely from the realism of the war.

The following facts illustrate the development of a progressive attitude in the Australian Army towards the problem of these diseases. At the beginning of the war the order issued to the "military guard" of the barbed-wire compound in which venereal cases were camped on the Egyptian desert at Mena were:

All patients will wear a white band on the right arm. The hospital is in quarantine and the O.C. Guard will take all measures to ensure its isolation. He will post four sentries one at each front of the hospital lines. A flying picket will move among the tents and a picket on the southern side of the hospital near the latrines. He will be responsible (*inter alia*) that the sentries are properly posted and alert and do not speak to patients; that no patient is allowed to leave the hospital lines or receive food or other article from outside; that no visitors are allowed into the lines; that personnel are admitted only on production of their identity disk; that any unauthorised person entering or leaving is placed in the guard-room.

Mitigated though it often was by the medical command, this fierce discipline was normal and was held to be necessary. While it may be conceded that a small proportion of these men were actual "criminals", it is certain, and deplorable, that this attitude that treated them all as criminals had often an evil outcome. The type of men who were put under this guard are thus described by the medical officer in charge of them:²⁶

The following are the result of careful personal enquiries from the first 300 patients under my charge in No. 2 A.S.H., January, 1915. The vast majority were youths, some still in their teens, others in the early twenties—85.3 per cent. had been infected for the first time. The greater number of these assured me they had been ignorant of the risk they ran. I have reason to believe most of them. In those early days of the A.I.F., education of officers—medical, clerical and combatant—and men in regard to sex hygiene, the risks of illicit intercourse, and the effects of venereal infection, was not effectively undertaken. (There was) a harmful and erroneous belief among many officers and men that venereal disease is easily cured, and that continence is harmful to health and that it is unmanly.

Of the short experiment of "social" methods, which as previously stated was made early in 1916 at Great Peter Street

²⁶ Memorandum by Maj. B. T. Zwar, A.A.M.C., No. 2 A.S.H. See the same officer's article in the *M.J.A.*, 5 July 1919, "The Army Medical Service and the prevention of venereal disease".

Convalescent Depot for the A.I.F. in London, the medical officer²⁷ then in charge notes:

There are two typical methods of venereal prophylaxis just as there are two lines of venereal treatment, which in the early days of the war and under some officers in their extreme form contrasted as two well-marked and opposing attitudes. They may be termed (a) the Punitive (or aggressive) and (b) the Constructive (or expectant).

(a) *Punitive method.* The contraction of V.D. was regarded as a crime to be punished. The man must lose his pay, and the hospital must be to some extent a penitentiary, a dread of the consequences of sexual misconduct must be imposed by these and other such methods. The man must have his disgrace kept well before him; it must be well branded in his pay book. The natural consequence—concealment of disease was bound to follow, but was to be heavily punished if detected. It may be objected that this statement of punitive prophylaxis is too crude and insisted that only concealment was a crime. But practically the patient was often made to feel like a criminal and the deterrent motive appealed to was fear—fear of losing his pay—of being found out by his people—of losing the respect of other men—of the routine of a V.D. hospital and its grisly sights and circumstances. Complete loss of self-respect, tending to reckless living often resulted.

(b) *The constructive method.* The methods described above are now much altered and no longer in the ascendant. Reform and wiser ideas are coming as in prison life and the best municipal prostitute hospitals abroad. (This attitude presumes) that every man has a "*vis medicatrix naturae*" working for health of soul as well as for health of body. This was the underlying principle of the administration and discipline at Great Peter Street Convalescent Depot. Everything was done to subject the men to home-like influences; they had freedom in the afternoon and evening and could visit friends, go to theatres, etc.; and we got up entertainments for them and brought them into friendly contact with the personnel of the concert parties. We had flowers and pictures about, a fine billiard table and a comfortably furnished reading and writing room.

Some feared that through the place being made such a comfortable home men would deliberately delay cure to stay there. No doubt, a few fellows played up; amongst a large number you will always find a few too thoughtless and too selfish to play the game; but they were only a few and did not represent the tone of the place at all.

But the most striking experiment in this direction—indeed one of the most spectacular successes in the handling of

Australians that the war furnished, an example of high and permanent value—was that undertaken in Australia by Captain W. T. Conder at the camp, or later, hospital at Langwarrin in Victoria to which V.D. cases in Australia were sent. The following is an authoritative account.

**The success
of Langwarrin**

²⁷ Maj. J. W. B. Bean, A.A.M.C.

Langwarrin was originally a camp for prisoners of war. The first V.D. patients were sent there in March, 1915, from overseas; later came more returned soldiers and, with men called out of the local camps, the numbers rose rapidly.²⁸

It is understood that the Defence Department gave to the Victorian Government an undertaking that, if a camp for the housing and treatment of venereals was formed in Victoria, it would be made so secure that the men could not get away from it while in a state of infection. There was a popular belief that returnees from Egypt had contracted a particularly virulent form of infection.

Consequently, until August 1915, Langwarrin was treated as a "prison" hospital. The men were herded behind barbed-wire enclosures, and two hundred militia men were employed as guards. There were three or four officers (militia) and about as many doctors. The accommodation was miserably unsuitable; the round tents then universally used were old and leaking and unfloored, and, in wet weather, damp and muddy. For bedding the men had only blankets and rubber sheets and they were dressed in oddments of uniform and plain clothes. The small medical staff found it impossible to treat the men adequately. There was no proper water-supply; all the water was carried by train from Mordialloc and thence by water-cart to the camp. The lack of bathing facilities implied habitual personal uncleanness. The attitude of the public and authorities towards the men was that they were "Untouchables". Naturally they were disgruntled, spiteful and insubordinate. Recovery under such conditions was difficult and slow—in some cases impossible. What the patients endured before treatment began to be remedial can only be conjectured and the unhappy men continually broke camp despite the barbed wire and armed guard.

Conditions at Langwarrin were changed by the collaboration between a wise and humane old soldier, Brigadier-General R. E. Williams, Commandant of the 3rd Military District, and a hard-working young soldier, Captain Conder, Camp Commandant. The idea which these men shared was that of restoring Langwarrin patients to health and self-respect by improving

²⁸ See table on p. 178. The policy of returning to Australia every soldier who contracted venereal disease—which obtained during the first year of the war—was stopped in Oct. 1915 on the initiative of Gen. Fetherston, acting D.G.M.S. On Dec. 22 the Australian Dermatological Hospital was despatched from Australia.

their treatment and environment and converting the "prison" camp into a hospital and sanatorium.

At first the attempt was made to adapt the old camp to its new purpose by all sorts of arrangements and contrivances. But it soon became evident that nothing short of the creation of a new camp would enable those responsible to make such arrangements and build such an organisation as alone could be expected to result in the proper discipline so necessary for good medical results.

In place of tents, wards were built. Langwarrin ceased to depend on water-carts when boring was carried out in the camp reserve and wells sunk and an adequate supply of water was obtained. The Red Cross Society built a commodious bath house with furnace and boiler apparatus to provide hot as well as cold showers for all. In the same building there was a large irrigation treatment room in which it was possible to treat 96 men every ten minutes. This enabled the bulk of routine treatment to be done in squads under strict supervision, which freed the medical staff for more scientific treatment of the individual case.

The new camp was not only cleaner, but more attractive than the old. It was laid out in garden and lawn, with a recreation hall built by the Y.M.C.A., and a Red Cross hall for entertainments. The public became interested in the camp and gave chairs and tables, books and cupboards and billiard tables. The buildings were painted and electric light installed. There were picture shows and camp shows with stage scenery made and painted by the patients, and a band was formed and played regularly. Sports were organised and interests for the men created. The camp mascot was a beautiful pony; other pets were deer, kangaroos, swans and guinea pigs—living things to appeal to the sympathies of the men.

To break the "prison" tradition the guards were removed; the patients provided their own guard. Under the regulations a V.D. patient sent to Langwarrin drew no pay. From February 1916 all patients who acted as orderlies and who did guard duty were paid at the rate of 5/- per day, 1/- per day being paid while they were at the V.D. camp and the balance of 4/- per day for each day's duty being paid on return to training

camp when cured and fit for duty. The figures below show how this attempt at the restoration of the men's self-respect was justified.

A W.L.				Deserters.				Offences dealt with during year.			
1916	..	..	926	1916	..	..	88	1916	..	..	1,487
1917	..	..	199	1917	..	..	22	1917	..	..	497
1918	..	..	33	1918	..	..	nil	1918	..	..	108

The number of patients who passed through the camp from March 1915 to June 1920 was 7,242. More than 6,000 patients discharged from Langwarrin went overseas on active service; they won 400 decorations, including a V.C.

The work of the medical staff at Langwarrin and their remarkable success in shortening the period of remedial treatment and adding to the scientific knowledge of V.D. have been favourably noticed. This work was done with due attention to economy, and the total average cost of drugs used from the day of entry to the day of discharge was reduced from about £3 to 15/10³d. per man. It may be added that the appointment of a dental officer facilitated the work of the medical staff. Every man's mouth was examined when he arrived in camp, and although dental treatment was conspicuously successful in syphilitic cases, there is reason to believe that the improvement in patients suffering from other diseases was at least in part attributable to dental treatment. As far as it was possible all patients left the camp dentally fit.

From a prison, Langwarrin was transformed into a hospital in which patients in surroundings both mentally and physically attractive could recover from one of nature's cruelest punishments, and where science and sympathy could triumph over righteousness. The effort was to mend and help every man sent there, to send him away a wiser human being, a decent citizen and a better trained soldier than when he entered the camp.

The figures shown on the following page show this success in tabular form. The Royal Commission that enquired into the administration of the Defence Department reported in March 1918 on the work:

These results are eminently satisfactory and of a most encouraging nature from a medical standpoint; but the percentage of locally contracted cases [*i.e.* those occurring in Australia] is alarming, and calls for drastic action.

**ADMISSIONS AND DISCHARGES TO LANGWARRIN V.D. HOSPITAL
INCLUDING MEN RETURNED TO AUSTRALIA FOR TREATMENT**

	Gonorrhoea.		Chancroid.		Primary Syphilis.		Secondary Syphilis.		Tertiary Syphilis.		Gonorrhoea and Chancroid		Gonorrhoea and Syphilis.		Syphilis and Chancroid		Gonorrhoea, Syphilis, and Chancroid.		Not diagnosed or non-V D.		Total.	
	Adm.	Disc.	Ad	Disc.	Ad.	Disc.	Ad	Disc.	Ad.	Disc.	Ad.	Disc.	Ad.	Disc.	Ad.	Disc.	Ad.	Disc.	Ad.	Disc.	Adm.	Disc.
1915 March-June	366	364	107	107	97	89	5	5	—	—	8	6	48	32	8	5	2	1	92	59	733	668
1915-16 ..	2559	2130	223	223	213	127	37	18	—	—	39	35	81	38	2	3	—	—	7	21	3161	2595
1916-17 ..	1195	1429	76	72	112	185	43	61	2	1	16	19	39	78	4	5	—	1	9	28	1496	1879
1917-18 ..	575	591	12	11	61	69	72	47	23	14	6	7	38	80	3	2	3	1	—	1	793	823
1918-19 ..	272	390	21	11	72	57	60	53	10	13	3	5	21	62	4	4	—	2	3	2	466	599
Total ..	4967	4904	439	424	555	527	217	184	35	28	72	72	227	290	21	19	5	5	111	111	6649	6564

The purely negative method of dealing with the problems of venereal disease was always of questionable value among Australians. Social conditions in the Australian Dermatological Hospital improved towards the end of the war. In the matter of prevention, in conjunction with other deterrents, such as the fear of infection, the various forms of penalty—return to Australia, stoppage of all leave, loss of commissioned rank, stoppage of pay, entry in pay book, publicity, penal camps, etc.—may have reinforced more worthy inducements to avoid risk, or to take precautions. The value of these however in *limiting the incidence of V.D. in soldiers on active service* must still be looked on as problematical. In the armies of other nations also there appears to have been, as the war went on, less and less reliance on fierce disciplinary measures.

For the purpose of comparison the methods adopted and results achieved in other national armies have been epitomised as follows:²⁹

Great Britain. The British War Office relied at first chiefly on disciplinary measures, greatly relaxed for officers. From May, 1916

**Other
national
armies**

"Early Treatment Centres" were formed in the Commands in Britain and ultimately the War Office made provision for prophylaxis (called "Early Treatment") almost as exact as in the dominion forces, except that prophylaxis *before* contagion was not authorised officially. On the civil side soliciting was regulated, and the prostitute hustled about. An organised scheme of treatment, especially of syphilis, was launched in the "Venereal Disease Act, 1917". The difficult problem of "606" substitutes was tackled with notable success.

Canada. The history of V.D. in the Canadian Corps is a remarkable one. In their dreadful experience on Salisbury Plain in the winter of 1914-15 the rate per 1,000 per annum of V.D. ran up to 222. Thereafter, by an admirable constructive campaign the rate was reduced progressively to 81 per 1,000—a figure which (though more than double that of the British Army)³⁰ was almost half the Australian and New Zealand. The chief features of this campaign are summarised in the *Canadian Official Medical History* (Macphail), p. 293, as follows:

"A special department was organised in the Canadian Service to cope with venereal disease. Education was considered the most important pre-

²⁹ The sources are—*British*: Official Medical Histories, British, Canadian, New Zealand. *French*: Médecin Inspecteur Général A. Mignon, *Le Service de Santé pendant la guerre 1914-18*. *German*: Sanitätsbericht über das Deutsche Heer im Weltkrieg 1914-18, Band III. Useful data are contained in the confidential report of the British delegates and delegates from the overseas dominions to the Sanitary Conferences of the Allied Powers, 1917, 1918 and 1919, and official *Procès Verbal* of these.

³⁰ British figures are based on hospital admissions, which do not appear to have been controlled by systematic parades.

ventive measure. Pamphlets were issued; lectures were given by regimental officers, by an officer in each convalescent hospital, and by a staff officer detailed for the purpose. Instruction was given to all troops landing from Canada, to troops in training and to those arriving on leave. Early treatment centres were established in every medical officer's hut, at the entrance to camps, and in a convenient place in London."

According to the same authority—accepted *cum grano salis*:

"The Canadian Corps was practically free from venereal disease contracted in the field."

New Zealand. The measures adopted in the N.Z.E.F. did not differ materially from those in the A.I.F. The following is from the official history of *The New Zealand Medical Services in the Great War 1914-18*, p. 372, by Lieut.-Colonel A. D. Carbery:

"Prophylactics were on sale at all New Zealand canteens at a nominal cost, and ablution rooms were provided in each unit; men were warned, as far as possible, of the dangers of infection and the methods of prevention; but practically all cases admitted with disease had failed to use either preventives or the ablution rooms. At the end of the year there were 400 patients in the venereal section [of No. 3 New Zealand General Hospital at Codford] with 200 convalescents attached. Approximately 3,600 men per annum of the N.Z.E.F. were infected and required treatment and about two per cent. of the strength in England and a less proportion in France were constantly sick by venereal disease. This was not a very high percentage, but sufficient to warrant strong efforts directed to reduction. The estimated loss to the State by this wastage was stated to be £70,000 a year.

The following table shows the rate per thousand per annum of recorded admissions to hospital for Great Britain and Australia.

Some comparable figures

	1915.	1916.	1917.	1918.
British troops:				
In Britain ..	23·51	29·73	31·93	33·36
In B.E.F. ..	29·65	18·23	25·60	32·36
Australian troops:				
In Britain ..	134·05	148·1	129·2	137·12
In B.E.F. ..	58·7	72·6	59·6	63·65

Corresponding figures for the other dominions are not available.

The total incidence on 330,714 embarkations works out at 158 per thousand, exactly the same figure as is given by Macphail for the Canadian forces. The corresponding figure for New Zealand is believed to be in the neighbourhood of 130.

American Expeditionary Force. The history of venereal prophylaxis in the A.E.F. is a matter for a book rather than a paragraph. In no force was a more determined and systematic effort made to control these diseases and in none, except the German, was the "liberty of the subject" held of less account where the efficiency of the force was at stake.

A communication to the Interallied Sanitary Conference, 1919, states: "The principles upon which the control of venereal disease in the A.E.F., has been based are:

"(1) Diminution of contact with infected women by active opposition to prostitution, and putting out of bounds for A.E.F. soldiers all places where prostitutes are known to ply their trade.

"(2) Early medicinal prophylaxis after illicit intercourse.

"(3) Punishment for contracting venereal disease.

"(4) Education upon the subject of sex hygiene, venereal diseases and alcoholism.

"(5) Provision for wholesome recreational and athletic opportunities." Punishment is effected by:

"(a) Trial by court-martial in every case of venereal disease, whether or not the prophylaxis has been taken. If prophylaxis is taken within the first hour after exposure it is 100 per cent. successful, and if within three hours it is 98 per cent. successful.

"(b) A more severe penalty if there is no record of having taken prophylaxis."

Other general disciplinary measures were combined with this, the whole protective system being controlled by regular inspections, and "surprise" inspections also were made. Remarkable local successes were achieved. Thus at Bordeaux the average rate per 1,000 from December, 1917, to May, 1918, was 150-180. Registered houses were then put "out of bounds" and the rate fell to and remained at between 60 and 80.

In spite of all this V.D. was one of the most serious medical problems of the American force in the War. According to the *American Official History*³¹ the pre-war rate in the Army was 91 per 1,000 per annum and prophylaxis was compulsory. In the war, out of 3,515,464 "admissions to sick report for disease" in the American Army, "respiratory diseases" (1,159,177, representing 26.63 per cent. of the "total number of men in the Army" or 1 in every 3.5 men) came first: venereal disease (357,969: 1 in every 11 men) "was responsible for the next largest number of admissions".³²

France. The broad lines of the French system of venereal prophylaxis have been indicated. Direct measures were left to the individual. In 1918 the French representatives to the Interallied Sanitary Conference "emphasised strongly the large part which was being played by 'illicit prostitution'" and the "difficulty of devising really practical measures for controlling its prevalence and results". "Post-coitus cabins" had been a failure—"the men would not use them". In the civil community a wide campaign of free treatment was initiated.

³¹ Vol. IX, pp. 67 and 263.

³² The American figures were presented to the Allied Conference with refreshing lucidity and ingenuousness. The sources of the figures were given; relevant facts were noted, as, for example, that they were based on compulsory inspections, not on voluntary reporting; and the rates were stated precisely, as at per 1,000 per annum of strength.

Figures for the French Army (Mignon *Vol. IV*, p. 724) are shown hereunder:

Rate per 1,000 per annum. (Figures for 1914-15 not available.)

	Army in the Field	Armies of the "Intérieur".	Total.
1913	—	—	17·72
1916-18	3·65	79·54	83·19

Italy. Chief reliance seems to have been placed on the control of prostitutes. But the delegates reported that "The results of close surveillance (of these) do not affect the main cause of the spread of venereal diseases which is found in 'clandestine' connection which has increased since the war began." Post-coitum cabinets had proved useful.

Actual figures for the Army are not available; in the Navy the V.D. rate in 1917 was 38, and in 1918 35 per 1,000 per annum.

On the civil side as in France and Britain a campaign of treatment was undertaken.

Japan. In the Japanese Navy syphilis had much decreased since 1895, gonorrhoea very little. In 1914 V.D. occupied second place in the list of diseases, but it was stated at the Interallied Conference that "if consideration is given to duration and severity they should come first". In the war all the recognised deterrents and prophylactic measures were used. They included stoppage of pay, personal prophylaxis, sports and active exercise, lectures, books, amusements and so forth.

Germany. It is not easy to arrive at exact figures for the German Armies owing to the difficulty of understanding their system of recording casualties. The following table is taken from *Sanitätsbericht über das Deutsche Heer im Weltkriege 1914-18, Band III, Table 141*. It appears to present the figures up to July, 1918 of admissions for V.D.

Year of War.	bei dem Feld = und Besatzungsheer (Field Army and Army of Occupation)			
	bei der Truppe ⁸³	o/oo K (on establish- ment)	in die Lazarette	o/oo K (on actual strength)
1914-15 ..	93,787	21·1	132,359	29·8
1915-16 ..	137,478	20·6	181,992	27·2
1916-17 ..	134,342	18·5	173,882	24·0
1917-18 ..	158,162	22·2	214,810	30·2
1914-18 ..	523,769	82·2	703,043	110·3

The following prophylactic measures are described:

⁸³ The term *bei der Truppe* seems to be the equivalent of treatment in regimental establishments, *in die Lazarette*, in the hospitals of the Army and lines of communication.

The German statistics from field returns cease in July, 1918; those compiled by the Archives, in 1933. The table above appears to be based on the former.

(a) Soldiers.

Health inspection for contagious diseases every 14 days or more often, particularly before going on leave and on return to the front.

Instructions to junior officers, N.C.O's and men by Officers of Health on the dangers, prophylaxis of this infection and dangers of alcohol.

Installation of the necessary prophylactic material in institutions.

Declaration of the disease and indication of the source of disease.

Immediate evacuation to special hospitals.

(b) Civilian population in occupied zone.

Strict control of visits to houses of prostitutes.

Compulsory treatment of affected women.

Prostitutes to have photograph of themselves with date of last examination stamped on it.

Strict military surveillance of public houses.

The following statement is characteristic of the attitude of less responsible elements in German literature of the war.

"Of all the warring nations Germany was the only one to undertake anything resembling a systematic solution of the problem and to apply what had been learnt from the experience of past wars . . . England, whose army and navy had always shown a record number of venereal diseases, a fact strangely overlooked or neglected by its puritanical morality, just saw a further spread of venereal diseases, and the French standpoint was, from the outset, rather anarchistic."³⁴

An ingenuous search of the literature does not disclose justification for these claims; and it is fair to say that it is reflected in official histories only in a general attitude of self-conscious superiority.

In every force these diseases came very high among the causes of Army wastage. The general impression gained is that the human male does not differ greatly in the several civilised communities engaged in the war—and that, as Sherman said, "War is Hell".

After the Armistice the concentration of troops round Charleroi awaiting their return to Australia called for special measures at the front. The reaction from war service tended to increase the disease, and the fact that the troops were about to return to Australia raised a pressing national problem. Social and moral activities were vigorously fostered; for example the work of

**Conclusion from
the foregoing**

**After the
Armistice**

³⁴ *The Sexual History of the World War*, Edited by Dr. Magnus Hirschfeld, p. 92.

the Y.M.C.A., and Comforts Fund. An order issued by the acting A.D.M.S. of the 2nd Australian Division (Lieut.-Colonel A. M. Wilson) on 14th December 1918, says:

In the Charleroi area are living about 400 prostitutes "legitimised" by the Belgian authorities. These women are subjected to a fortnightly examination by a Belgian doctor and are supplied with registration cards. As far as can be ascertained there is not a very large proportion of V.D. amongst these women. The greatest danger is from the "unregistered" prostitutes who frequent the streets. Large numbers of these women have venereal disease and they are not subjected to any medical examination. Many of them have been placed in a special hospital by the Belgian authorities as they have infected soldiers who have been able to identify them. About 200 of these women have already been segregated. During the German occupation of the town, no attempt was made to deal with these women and very little supervision was exercised over the German soldiers suffering from venereal disease. All troops so far billeted in this area have suffered severely from the ravages of the disease and at present there are many cases in the C.C.S. set apart for venereal cases.

In view of the above facts it is extremely desirable that energetic steps should be taken to prevent the spread of the disease among the troops of the Division.

The following suggestions are made:

1. A vigorous propaganda should be conducted among the men pointing out the great dangers of contracting V.D. in Charleroi, especially from unregistered women.
2. Special steps should be taken to ensure that *all* men report to the "Blue Light" places *immediately* after undergoing risk of infection, delay of a few hours is fatal to the success of the treatment.
3. The greatly increased risk through men combining their sexual pleasures with alcohol.
4. The immediate establishment of "Blue Light" places in the new area and the communication to all ranks of the location of those "Blue Light" places in Charleroi.
5. The great value of "French Letters" as a preventive of venereal disease.

The D.D.M.S. Australian Corps (Colonel Barber) naively records of this time that:

"Blue Light" Depots were established in all towns visited by the troops, including Brussels, Namur, and Charleroi. During an inspection of the three depots in Charleroi it was found that they had dealt with 12,000 patients (Australian, British and Canadian) in the previous week, thus showing their necessity, and that they were fully appreciated by the troops.

The prospect of early return to Australia of some 250,000 troops of whom a considerable proportion had suffered from

venereal diseases opened up—for the Australian Government and for the A.I.F.—another and very important aspect of the V.D. problem. In March, 1919, Colonel Raffan presented to General Howse a memorandum of which the following is an epitome:

**V. D. and
Repatriation**

The most important question of all is the existence of large numbers of soldiers who have been treated for V.D. but who are not yet cured. It is estimated that in each of the 5 Divisions there are 250 soldiers who require treatment for syphilis, and slightly more cases of chronic gonorrhoea. . . . This means that apart from the 2,000 now in hospital there are 2,000-3,000 men who require further treatment.

"In the interests of public health" he advised that all penalties be abolished as from the time of the Armistice, and that invitation be extended to all men who had had venereal disease, whether or not it was believed to be cured, to report the fact and undergo special treatment before return to Australia.

This was given full effect. The problem of chronic gonorrhoea was found almost insuperable. For syphilis a systematic campaign was undertaken, in the field units in France and the A.D.H. in England. The course consisted of

6 intravenous injections of novarsenobillon, 45 gramme (or its equivalent) at intervals of 7 days.

6 intramuscular injections of mercurial cream at intervals of 7 days, alternating with the intravenous injections. The time occupied will thus be about six weeks.

This was ordered to be undertaken "not less than 8 weeks after the termination of any previous treatment". Provision was also made for acquainting the authorities in Australia of the condition in each case. Many availed themselves of this treatment and the action proved most useful in the case of a number who had wrongly believed themselves cured.

Transports to Australia. The arrangements made for the return of venereal cases by transport during the war, the provision made in Australia for their reception and treatment, and the problems furnished by them in connection with invaliding and pensions are discussed in the chapters on transport to Australia and on "Repatriation".

The tables at the end of this chapter disclose a high incidence rate for V.D. in the A.I.F., as in other national Armies: heavier in the Australian and other oversea troops, far from their homes, than in the British. The figures will discourage

those who (doing a great disservice) attach unwanted haloes to the very human heroes who fought and died in the Great War.³⁵ For, whether we like it or not, the fact must be faced that the soldier involved in the heat and circumstance of "battle, murder and sudden death" in particular in a war of attrition, must be regarded differently from the same man in peace. He is chained to the treadmill and so long as he may must tread it, and a sordid task begets sordid passions. For the purpose of war we set loose in some men at least, the primitive instinct of "blood-lust"; and we should not wonder if the artificial bars that in man's social life tend to restrain or sublimate the "sex-lust" are also thrown down.

**Ethics: and
commonsense**

The great experiment conducted by General Howse on the advice of his specialist was certainly less effective than it would have been had the responsibility for the constructive promotion of morale through amenities, recreational and social, been wholeheartedly accepted by the medical service. The negative campaign of prophylaxis would have been greatly helped by such positive measures.

The result of the Australian experiment makes it clear that the command of man over himself and over his fellows will need to be increased to a degree not yet within sight before racial freedom from the venereal diseases can be hoped for; at least this is likely to be the case in nations in which not only war but the normal social economy of peace produces a mode of life in which, for very many citizens, promiscuous intercourse or celibate continence are the only alternatives to "marriage on the dole".³⁶

The following figures are derived from various sources, official and unofficial. They are as correct as the records permit; but must be accepted E. and O.E. Venereal statistics are notoriously subject to errors of omission and of commission. It can be said at least, of those presented, that they result from an honest endeavour to reach the truth.

**Additional
statistics**

³⁵ They would have afforded *e.g.*, little support to the demand for public apology, made and obtained at pain of prosecution, for a quite correct statement made in the public Press regarding the incidence of the diseases in the A.I.F. But they will not abate one jot his regard for the force or for its men in any man who is in the habit of looking life in the face

³⁶ The great majority of Australians would probably marry and have children if they could afford to do so. It is not without significance that the A.I.F. brought back to Australia about 18,000 wives, children and *fiancées*

Rate per 1,000 per annum of mean average strength of A.I.F. overseas admitted to hospitals for treatment of venereal disease. All theatres.

Year.	Mean Average Daily Strength	Admitted to Hospital.	Admission rate per 1,000 per annum.
1915	73,616	4,046	54·96
1916	169,525	13,531	79·82
1917	222,510	19,305	86·76
1918	201,431	15,656	77·72
1915-18 average ..	154,960	52,538	84·79

Percentage of A.I.F. overseas admitted to hospital for treatment of venereal disease on more than one occasion.

Relapses	16·38 per cent.
Re-infections	6·55 per cent.
Re-admissions	22·93 per cent.

Rate per 1,000 per annum of mean average strength of A.I.F. overseas admitted to hospital for treatment of venereal disease excluding re-admissions or relapses.

Gross total admissions	52,538
Less admissions for relapses ..	8,605
Total incidence during 1915-1918..	43,933—70·87 per 1,000 p.a.

Admission rate to hospital for venereal disease of members of the A.I.F. in Egypt during 1915, and Egypt, Sinai and Palestine during 1916, 1917 and 1918, shown as rate per 1,000 per annum on average daily strength.

Year.	Average Daily Strength	Admissions to Hospital.	Rate per 1,000 per annum.
1915	30,327	4,046	133·41
1916	42,424	5,842	137·7
1917	16,469	878	53·3
1918	18,050	1,979	109·6

Admission rate to hospital for venereal disease of members of the A.I.F. in the United Kingdom and B.E.F., shown at rate per 1,000 per annum on average daily strength.

	Year.	Average Daily Strength.	Admissions to Hospital	Rate per 1,000 per annum.
U.K.	1916	41,199	4,146	134·05 ⁸⁷
B.E.F.	1916	59,978	3,521	58·7
U.K.	1917	66,792	9,932	148·1
B.E.F.	1917	118,454	8,595	72·6
U.K.	1918	35,912	8,187 ⁸⁸	—
B.E.F.	1918	110,031	6,499	59·6

⁸⁷ This rate is based on the last three-quarters of the year

⁸⁸ These admissions include transfers from hospitals in France

Comparative rates of admission to No. 1 A.D.H., Bulford, from the 3rd Australian Division and the A.I.F. training battalions between July and November, 1916 (153 days) shown as rate per 1,000 per annum of strength.

	Average Strength.	Admitted to Hospital.	Admission rate per 1,000 p.a.
3rd Aust. Divn. ..	19,772	626	75.73
A.I.F. Troops in U.K. excluding 3rd Divn.	36,721	2,526	164.10

Details obtained at Early Treatment Section, London, from men reported for such treatment.

Intercourse with Professionals .. . 28,637— 70.74 per cent.

" " Amateurs .. . 11,843— 29.26 per cent.

Total .. . 40,480—100.00 per cent.

Percentage of cases admitted to No. 1 A.D.H., Bulford, who acquired venereal disease during year ended February, 1919, in London and elsewhere in U.K.

Acquired in London .. . 63.97 per cent.

" " Glasgow .. . 4.92 per cent.

" " Edinburgh .. . 4.31 per cent.

" " Other towns .. . 26.80 per cent.

100.00 per cent.

Admissions to No. 1 A.D.H., Bulford (Venereal and Other Infectious Diseases) from March 1917 to March 1919, showing from where admitted.

Year	Command Depots	Admn. Hdqrs London	B.E.F. Leave or Transfer	Training Battalions etc.	Total Admissions
1917 ³⁹	4,083	31	821	4,132	9,067
1918	5,025	62	1,715	2,602	9,404
1919 ⁴⁰	912	37	3,236	1,228	5,413
Totals	10,020	130	5,772	7,962	23,884

Average duration of stay in No. 1 A.D.H., Bulford, for various types of venereal disease.

Period	Syphilis	Gonorrhoea	Syphilis and Gonorrhoea	Chancroid and Gonorrhoea
1917				
April-June ..	27 days	50.5 days	62 days	17.3 days
July-Sept. ..	17.3 "	42.4 "	54.3 "	20 "
Oct.-Dec. ..	12 "	44.6 "	45.3 "	17 "
1918				
Jan.-March ..	11 "	49.1 "	49.3 "	39 "
April-June ..	8.2 "	40.9 "	54.9 "	44 "
July-Sept. ..	6.4 "	50.4 "	42.5 "	28.5 "
Oct.-Dec. ..	6 "	50.6 "	57.3 "	66 "
Average ..	12.56 "	46.9 "	52.2 "	33.1 "

³⁹ From March to December only.

⁴⁰ From January to March only.

Details of prophylactic and early treatment given at A.I.F. Depots, U.K., and at Early Treatment Section at A.I.F. Administrative Headquarters, Horseferry Road, London, from June 1917 to June 1919.

	Nargol and Blue Light outfits issued	Condoms issued	Number reported for Early Treatment	Number received Prophylct. Treatment	Number received Abortive Treatment	Number cured after signs	Percentage of cures
London Depots	47,472 225,508	64,564 132,261	213,064 209,823	223,424 143,107	654 16,671	439 12,504	
Total	272,980	196,825	422,887	366,531	17,325	12,943	74.7

NOTE.—Those shown as cured by the abortive method were not admitted to hospital and are therefore not included in the figures for venereal disease showing rates per 1,000 per annum.

Admission rate to hospitals, compounds, etc., for venereal disease of members of the A.I.F. in Australia (excluding men returned from overseas for treatment) shown as rate per 1,000 per annum on average daily strength.

	Average daily strength	Admissions to hospitals etc.	Rate per 1,000 per annum
Average for 1915-18	44,888	12,689	94.23

Proportion of men examined during the "Call Up" in October, 1916, in Australia, found on examination to be infected with venereal disease.

Number examined	..	..	..	..	141,100
Infected with syphilis	..	..	..	..	825
Infected with gonorrhoea	..	..	..	..	1,975
Proportion infected	..	..	..	..	19.8 per 1,000

Ages of men admitted to Venereal Hospitals and Compounds in Australia.

	Under 20	20-25	25-30	30-35	35-40	40 and over	Total
	1,655	5,732	4,735	1,443	748	526	14,839
Percentage	11.2	38.6	31.9	9.7	5.0	3.6	100

Duration of stay in hospital for venereal disease treatment shown as percentage of total admissions.

Under 1 month	..	44.4 per cent.	Under 6 months	..	1.8 per cent.
" 2 months	..	26.5 "	" 7 "	..	1.0 "
" 3 "	..	14.6 "	" 8 "	..	0.8 "
" 4 "	..	6.1 "	" 9 "	..	0.6 "
" 5 "	..	4.2 "			

Marital state of men admitted to hospital with venereal disease.

Married	..	..	..	..	13.5 per cent.
Single	..	..	..	..	85.8 "
Widowers	..	..	..	..	0.7 "

CHAPTER IV

THE INFLUENZA PANDEMIC, 1918-19

IN 1915 in the A.I.F. the disease diagnosed as "influenza" headed the list. Whether it was related in any way to the pandemic that in 1918 "put up a record" appears doubtful. . . . the notorious inexactitude in the use of the term "influenza" in peace, which was continued in the war, has resulted in a confusion far from creditable to the medical profession.¹

During the four years 1914-18 the Great War was responsible for some 27½ million casualties with some 8 million deaths among the nations engaged. In the twelve or thirteen months of the outbreak—approximately May 1918 to May 1919—it is estimated (*British Encyclopaedia of Medical Practice*, Vol. 7, p. 174) that some 15 million deaths were caused by the impact of a sudden infective assault by an "organism or organisms unknown". The clinical syndrome caused by them was identified, under the name "influenza", with a form of sickness which during the 19th century had been held responsible for five more or less extensive epidemics or pandemics.² What is more important, it was identified also with a strictly endemic

¹ See Vol I of the present work, 1930, p 75

² The following recorded outbreaks have been identified as caused by the "disease" which since 1580 has been known as "influenza". (Garrison, *History of Medicine*, p. 187). The first authentic pandemic of the disease is commonly placed in 1510. Since that date some thirteen "pandemics" have been tentatively identified, the most extensive in 1830-33 and 1847, culminating in that of 1918-19 here under review. ("Influenza, An Epidemiologic Study" by Warren T. Vaughan, *American Journal of Hygiene*, Monographic Series, No 1, July 1921). Sir Thomas Watson (1847) "quotes Cullen as saying that this species of catarrh proceeds from contagion"—he himself would only go so far as to agree that it was "portable" (*loc cit*, p. 21). One of the most characteristic features of the disease as a source of epidemics has been the fact that these major outbreaks have been interspersed with minor and local outbreaks vaguely identified as "influenzal". From the 'fifties onwards the term "influenza" was applied to almost every case of catarrh with fever. In 1889-90 a pandemic came westward. It was supposed to have originated in China and was attributed to the great floods. But it was known as "Russian influenza" just as the 1918-19 epidemic with no sounder basis was known as "Spanish". The epidemic and pandemic efflorescences of this disease and its endemic counterpart (or counterfeits) are reflected in Australian experience throughout the 19th century. Australian experience in the pandemic of 1918-19 presents certain special even unique features which are of the highest interest not only from the point of view of the history of the A.I.F. but of the history of epidemics and of epidemiology. These are admirably recorded in Service Publication No. 18 of the Commonwealth of Australia Quarantine Service (*Influenza and Maritime Quarantine in Australia*) by Dr. J. H. L. Cumpston, Federal Director-General of Health. A brief account of this experience is given in the chapter dealing with the return of the A.I.F. to Australia.

and domesticated disease, or congeries of diseases, under the title of "influenza", and was responsible for a considerable proportion of the total wastage of all armies from disease in camps, transports, and the field throughout the war. It was also—like this disease—attributed to the pleomorphic coccobacillus discovered in 1892 by Pfeiffer.³

Both these assumptions, and the complacency of the medical profession, received a severe jolt from the results of the clinical and other studies impelled by the pandemic, as was the world by its social results. The official summary of the debate on influenza in the Interallied Sanitary Conference on 24th March 1919⁴ states:

The extreme gravity of the influenza epidemic of 1918, its terrible social and economic effects, cannot fail to induce our Governments to use every means at their disposal in order to pursue the study of this disease.

However, as with many another pious hope created by the shock of those tremendous events, the failure could and did occur. "The subject," as M. Pottevin said in that debate, had been "illuminated, if not by a direct ray, at least with a vague light"; but not for another fifteen years—1934—was the "direct ray" to be thrown by the isolation of the virus; and on the clinical side there is still:

no more popular dumping ground than "influenza". There is no clinical syndrome that justifies the diagnosis of influenza; and the difficulty of diagnosis will remain until the clinician and the bacteriologist by their combined efforts provide us with means for making a diagnosis in isolated cases.⁵

Perhaps the most extraordinary feature of this extraordinary pandemic is the furious speed with which it spread itself

³ Thus in the *British Official History* the article "Influenza" (*Vol. I, Diseases of the War*, p. 174) is introduced as follows:

"Ordinary influenza was never absent from the various Army Commands during the war. . . . In 1918 the figures were about normal until in June there was suddenly a great increase. . . . In France the disease began by a few local outbreaks in the First and Second Armies in April and May 1918. . . . At the end of May it reappeared with great violence in Second Army."

⁴ This was drawn up for the conference by Professor Calmette and approved at the fourth meeting of the plenary session. The data for this chapter are partly drawn from the official report of the discussion.

⁵ *Medical Journal of Australia*, Leading Article, p. 63, July 10, 1937

The date of the discovery of the virus of influenza is commonly accepted as 1933, see Burnet, *Biological Aspects of Infectious Diseases*, p. 247 and Smith, Andrewes, and Laidlaw *British Journal of Experimental Medicine*, Feb., 1934, Vol. LIX, p. 201.

throughout a community, a locality, and the globe. The term "spread" seems indeed inapplicable; more appropriate simile for that speed might be found in the action following the dropping of a crystal into a super-saturated solution. The first "wave"—to borrow the curious term used by most writers—of the pandemic would seem to have appeared almost simultaneously over a great part of the globe. In the Interallied discussion the Chinese and Japanese delegates reported their first outbreaks in March and April of 1918. In the B.E.F. also the pandemic appeared first in April 1918, and in May it was rampant in the British, French and German armies. In the Naval depots in Britain it appeared first in "the early spring"; in the infantry commands and civil community in June. From outbreaks in Spain in May it reached Portugal in June⁶ but it was prevalent in the Italian Navy in May. In India its "presence was first noted" in Bombay, Calcutta and Madras in June. From a congeries of such imperfectly recorded facts grew the idea of a sudden catastrophic visitation—a veritable Act of God.

But a feature not less evident than this seeming world-wide synchronicity was the fact of focal spread, for example from bed to bed in a ward; from some new arrival in a unit or camp; from ship to shore or shore to ship;⁷ and from over the ocean to communities isolated by sea such as Australia and South Africa.

The *American Official History*, Vol. IX, p. 84, presents the paradox thus, from experience in U.S.A.:

That an epidemic wave once developed is spread by contact of cases, is of course incontrovertible. But that the widespread, practically simultaneous, increase in the rates that was observed not only with this wave but also with all the preliminary and recurrent waves of the pandemic could have been accounted for by transmission from case to case of a common source seems incredible.

The two phases. Almost universally this pandemic presents itself in two very clear cut phases—the initial one being of

⁶ According to Professor Jorge, representing Portugal.

⁷ "At the Cape of Good Hope ships were only kept free by cutting them off completely from the shore. At Sierra Leone some ships suffered very severely, the disease spreading to the shore; it was probably introduced from England by infected crews . . . In North America the disease was introduced into a ship of war from the shore, and during the passage to England there were 150 cases." (Surg.-Capt. P. W. Bassett-Smith, R.N.—Professor of Clinical Pathology, Navy Medical School, R.N. College—*Proceedings of Interallied Sanitary Conference, March 1919: Report of the British Delegates*)

great infective but very slight clinical virulence, mostly in the spring and early summer;⁸ it was followed after a definite though partial intermission by a second phase mostly in the autumn and winter. In this second phase, though commonly less extensive, it was relatively and absolutely a "disease" of great malignancy and in general of character widely different from that of the first phase in its clinical manifestations. The case mortality rose rapidly to a peak and continued high, while the epidemic itself petered out gradually with local recrudescences in the first few months of 1919. The date depended on the factors which determined the course of transmission. Before proceeding to an account of the course and effects of the epidemic in the A.I.F., and of its clinical features and pathogenesis, some general features call for a note.

Epidemiological features and affinities *Identity of first and second phases.* The following note is taken from the introduction by Colonel S. L. Cummins, A.M.S. to the *Medical Research Committee's Report No. 36, 1919.*

In the *B.M.J.* of 28 November 1918 Captain M. Greenwood, R.A.M.C., sets out in a striking manner the characters of the curves of incidence in past influenza epidemics. In this paper it is stated that "the fundamental characteristics of a primary epidemic of influenza are a very high attack rate and an approximately symmetrical distribution in time"; . . . "the graph of the epidemic is an almost symmetrical curve; the fatality is low, rarely more than 1 per cent of the cases" . . . "a secondary epidemic affects a relatively small proportion of the population, is slower in reaching its maximum, and thereafter declines slowly and irregularly—more slowly than it increases; its distribution is asymmetrical and there is less concentration around the maximum. Further a secondary epidemic is characterized by a vastly higher fatality than a primary epidemic."

Analysing the figures of the B.E.F. Colonel Cummins reached the conclusion that

There can be no doubt that the two epidemics were identical in nature. The difference observed between the cases admitted in the summer and those seen in the autumn were differences in degree and depended on the enormously increased virulence of the infective agent in the secondary wave.⁹

Identity with past epidemics. At the discussion on influenza at the annual meeting of the B.M.A. in 1919 Captain Green-

⁸ In the Northern Hemisphere.

⁹ It is certain that he should have added "or agents".

wood raised two issues "the solution of which" he said, "is necessary before we can fully understand the epidemiology of influenza".

The first . . . is whether the form of the first influenza wave in our recent experience . . . differed materially from that of the primary manifestation during the last great pandemic—the winter influenza in 1889-90.

His analysis of selected figures led to the provisional conclusion

that there is no clear-cut formal difference between the outbreak of 1889-90 and that of 1918, nor between its evolution in a mixed population and in one homogeneous with respect to age and sex.

Biological factors. The second issue—left open—was

whether the common features of the epidemic curves, the rapid rise, and the less rapid decline are sufficient to ground some hypothesis of the biological factors responsible.

Theories of epidemic origin. Various hypotheses were put out to explain the genesis of the epidemic:

(a) That it broke out in many centres throughout the world as the result of a pandemic "constitution" produced by the war—or an epidemic time factor. (b) That it spread (i) from east (China) to west, (ii) from west (Spain or America) to east. (c) That it was an epidemic exacerbation of the endemic disease. (d) That it was a development from the local epidemics of "purulent bronchitis" in Europe and epidemic empyema in the camps in U.S.A.¹⁰

Effects of the pandemic. Even the meagre facts recorded of the pandemic are of great interest. A few relevant features are given in the following summary:

Great Britain. The incidence of the disease in the general population is stated (*Report No. 4*, British Ministry of Health, 1920) as follows: "In 1918 there were 3,129 deaths from influenza per million of population in England and Wales. The corresponding figure for 1919 was 1,170."

¹⁰ The report of the Interallied Sanitary Commission's meeting says: "The reports presented to the Commission do not suffice to establish the source of origin of the epidemic which from March 1918 spread with extreme rapidity" (throughout the world). At this conference a French delegate, Dr. Louis Martin said: "It appeared to have started in March 1918 in China." Professor Jorge: "Other epidemics have spread from the east (Asia) to the west but the present epidemic seemed to start in Spain." *The British Official History, (Diseases, Vol. I) "Influenza", p. 175*, says: "The disease was world-wide, and its course seemed to be from west to east. It prevailed in America in 1917. In 1918 the first European epidemic on a large scale took place in Spain in May." Reading this account together with those of outbreaks of "purulent bronchitis" (p. 213) one might gather that endemic or "ordinary" influenza was, in fact, epidemic throughout the war, that in the spring of 1918 it suddenly assumed a new form, but reverted on a vast scale in the autumn.

Navy. The disease occurred in epidemic form in ships of the British Navy from the Shetlands to the Scilly Isles. It was prevalent throughout the Mediterranean and the Adriatic, the East Indies and the Persian Gulf. At the Cape of Good Hope ships were "kept free by cutting them off completely from the shore". At Sierra Leone one ship with a complement of 718 had 662 cases and 38 deaths. For the year 1918 the total cases of influenza on ships was 80,144. The total case mortality was 2·8 per cent. Mortality was much higher in the autumn than the spring; at one depot there were 928 with no deaths in the first epidemic, but 468 with 14 deaths in the second.

Army. The incidence of influenza throughout the war is shown in the following table, which is a summary of information given in *British Official Medical History of the War—Statistics*, page 86:

Campaign.	Period.	Admissions.	Rate per 1,000 of ration strength.
France and Flanders	1915	44,392	75·11
	1918	313,938	157·81
	(24 weeks)		
Macedonia ..	Oct.-Dec., 1915	795	13·06
	1916	252	2·04
	1917	984	5·39
	1918	19,862	154·27
Dardanelles ..	1915	3,126	26·70
United Kingdom ..	1914	6,047	4·72
	1915	31,360	21·21
	1916	36,072	22·57
	1917	28,980	16·98
	1918	139,682	86·55

British India. India suffered more severely than any other country. Figures given at the Interallied Conference showed nearly 5 million deaths out of a total population (census 1911) for British India of 238,527,625 with a death rate per thousand ranging from 66·7 to 4·7, and averaging 20·7. The report of the conference states: "Influenza is estimated to have killed not less than 6 per cent. of the population of the central India states, and was responsible for the deaths of upwards of 5 millions in British India and not less than 1 million in the native states; this estimate is conservative. The disease was excessively prevalent and fatal in Afghanistan, Baluchistan, Persia, Turkestan, etc. . . . Females suffered much more than males: the incidence of mortality was highest between the ages of 10 and 40, and among the troops the incidence was higher among British than among Indians, but the case mortality for British troops was 4·3 and for Indian 13·7 per cent" . . . The mortality in the first epidemic wave was almost nil: the second commenced in September and by the end of November the mortality rates approximated the normal throughout the country.

French Army. ("La Grippe"). The disease appeared in the Armies between 10th and 20th April 1918 in two small villages north of Compiègne. At the end of April it was diffused over the whole front.

It developed in two periods, May to August and September to December.¹¹

In the first period the number attacked was 43,620. In the second 188,825—a total of nearly a quarter of a million.

Incidence per 1,000 in French Army

May	June	July	Aug	Sept.	Oct.	Nov.	Dec
9.47	4.54	1.11	1.12	9.15	28.54	12.35	7.01

The case mortality ran from less than 0.2 per cent. in May, June, July to 8.1 in August and thereafter maintaining approximately this level.

American Army. Statistics for "inflammatory diseases of the Respiratory Tract" are given below. The *American Medical History* says that in the U.S. Army

"There were in all, during the World War, 3,515,464 admissions to sick report for disease. Of these, 32 per cent. were primarily for respiratory disease . . . 18.33 per cent. or 1 man to every 5.17 contracted influenza in the service, 6.27 per cent. bronchitis, 0.86 per cent. broncho-pneumonia, and 0.17 per cent. lobar pneumonia. The 1,159,177 cases of respiratory diseases represent 26.63 per cent. of the total number of men in the Army, or 1 to every 3.5 men. Venereal disease was responsible for the next largest number of admissions, followed by mumps.¹²

The figures given are

United States Army in France, Ratio per thousand per annum.

Influenza.	Bronchitis	Broncho-pneumonia	Pneumonia.	Total.
137.38	46.14	9.33	8.93	201.78

German Army. The figures for "Grippe" in the German Army are taken from *Volume III* of the official *Sanitätsbericht über das Deutsche Heer*, page 121. The following table gives the actual numbers for the field army and army of occupation, treated regimentally or in the hospitals of the army and lines of communication. The sudden apparent rise of the endemic disease "influenza" to epidemic proportion is particularly striking. (The table is as printed in the German work.)

Year	Regimental	o/oo of strength	In Hospitals	o/oo of strength
1914-15 ..	131,189	29.5	39,943	7.0
1915-16 ..	252,357	37.8	68,880	10.3
1916-17 ..	283,800	39.2	74,509	10.3
1917-18 ..	896,266	126.0	176,671	24.8
1914-18 ..	1,543,612	242.2	351,003	55.1

The two phase character of the epidemic was almost universal with this apparent exception that in an unvisited community—on a ship, for example—the epidemic took the form in which it occurred in the person who transmitted it.

¹¹ These facts are from *Le Service de Santé pendant la guerre 1914-18* (Médecin Inspecteur Général A. Mignon) *Tome IV*. This work carries the history only till the end of 1918.

¹² History of *The Medical Department of the United States Army in the World War*, Vol IX, p. 67.

In the troops in France. The experience of the several formations of the A.I.F. reflects, naturally, that of other troops in France and, as elsewhere, presents two fairly clear-cut phases.

The epidemic in the A.I.F. A description given by the Chief Consultant Physician B.E.F.¹³ may be epitomised as follows:

It is impossible to fix the exact date at which an epidemic begins. But there seems no doubt that the spring epidemic of influenza began by small local outbreaks on the northern part of the front during the month of April. These did not spread immediately, but about the middle of May the cases began to increase rapidly. In the First Army Major McNee had reported that "since about June 9th the disease has spread rapidly through that Army". Cases were observed in the Third Army on May 21st. "At the various bases it was noticed at the end of April in Rouen, Havre and Marseilles; early in May at Boulogne and Calais."

The numbers affected were "very great", but could not be estimated by reason of the mildness of the epidemic. From June 25th "the rate fell rapidly". Daily admissions to C.C.S. in Second Army had fallen from a maximum of 623 on June 25th to about 50 in the middle of August.

In the A.I.F. the disease appeared first in the 1st Division in Second Army, but by the middle of May was general throughout the formations in Fourth Army also. The following from Captain R. E. Nowland (one of the Australian medical officers lent to the British Army in 1918)¹⁴ gives a good picture of the first epidemic:

(Early in May) P.U.O. broke out in the brigade which, in my opinion, was the influenza that has been rampant ever since. The C.O. got it first, then it spread "like wild-fire" right through the brigade . . . At that time I had seen no literature on the subject, but recognized it was very infectious and that fatigue, bad ventilation, etc. predisposed to it. I isolated all cases and any man feeling "seedy". I had as many as 60 men in bed in one day, but of the whole number—between 400 and 500—only 2 were evacuated. The course most of the cases ran was that they were very sick for about 2 days, with intermittent temperatures up to 102°, severe frontal headache, constipation and general malaise. About the third day the temperature would subside, they would start to eat, and by the fifth day were able to get about, but were still a bit shaky; many had a cough with a good deal of muco-purulent expectoration, and some were very hoarse for a week. In from 7 to 10 days the epidemic had subsided and by the end of June we were practically clear of it. . . . Circumstances favoured us, we were out of the line, the weather was fine, and we had good billets.

¹³ Sir Wilmot Herringham opening the discussion on "Influenza" at the annual meeting of the B.M.A. 1919. See *B.M.J.* of 1 Apr 1919

¹⁴ He was attached to an artillery brigade.

The following summary of the experience of Captain A. H. Barrett with the 36th (Aust.) Heavy Artillery Brigade, illustrates the change in type but the essential identity of the two phases.

"On May 8th we had our first cases of the influenza epidemic. On that date I was called to the 1st Aust. Siege Battery billets to see 18 men down with vomiting, some headache, pains across the lower part of the chest, legs, and down the back. 7 had a temp. of over 104°, and all were quite helpless; 1 was delirious, was labelled 'flue' and was evacuated." In another battery, caught while on the move, "9 men were left in an ambulance dressing station and on the next day we had 20 men in bed (in billets). They were strictly isolated, but in 2 days we had 52 and the two medical orderlies were working night and day. They were all put in one barn, isolated, and none were evacuated. All got quite well though most of them for days had no appetite for meat, but took well to beef extract and custard made with milk and sugar. For a week the battery was practically out of action, but, after these cases cleared up, we had little trouble with influenza in this battery."

Other batteries however, suffered severely in the second phase.

Later in the year the character of the disease changed definitely. The onset was similar in most cases: sudden and with similar pains and the helpless feeling; but some men, when first seen, were already becoming dyspnoeic, with engorged appearance of the face. In these, moist sounds could generally be heard but no definite dullness, and the prognosis was bad. Various orders came from Army saying "all cases of influenza, however slight, should be evacuated." In this way we should have lost nearly our whole strength, while I am certain the spread of the disease would not have been stopped. And I so often had complaints from men evacuated, of their experiences when being moved about so much in transit, that—if I felt sure a man was going to recover—he was kept in the battery and made comfortable. Later in the year an increasing proportion had to be evacuated. In January 1919 13 men of one battery were suddenly ill within 12 hours, all in hospital for a long time, one died, and it was touch and go with 5.

At the Field Ambulances. In the B.E.F. from the middle of May though the nature of the outbreak was in doubt, an effort was made to tackle it by isolation. In the 1st Australian Division the A.D.M.S. (Colonel R. B. Huxtable) noted at the end of May:

Sick return normal except toward the end of the month when an epidemic of febrile nature broke out and spread rapidly. Of mild type, leaves very little disability, and clears up in about 5 days.

In Second Army No. 17 C.C.S. was set apart for "influenza". In all the field units we find much the same picture—a

febrile disease lumped under "P.U.O., N.Y.D. pyrexia, and trench fever", with the heading "influenza" appearing fairly frequently in June. In the 1st Field Ambulance only 30 cases were reported as treated for "influenza" in May. But in June "P.U.O. and influenza" have 613 out of a total of 875. By July,

the influenza epidemic has died out, and although one or two men have been seen with what appeared to be a recurrence of the true influenza (sic) there has been no large outbreak similar to the one we had last month.

At the Casualty Clearing Stations. Here the same picture presents itself. In No. 3 A.C.C.S. in April, "influenza" does not appear; "P.U.O., trench fever, and N.Y.D. pyrexia" are grouped and furnish 171 of a total of 897 medical cases (bronchitis furnishes 28, pneumonia 10). In May P.U.O. and its associates claim 336 out of 1,313; another 55 are labelled "influenza". It is added that influenza "became epidemic and all these cases were sent elsewhere" to special stations. In June the trio furnished 290 out of 1,431 and influenza 313. Summarised, the diary of No. 3 A.C.C.S. says:

"As the influenza epidemic continues, its virulence seems to be increasing, complications more common, and convalescence, before rapid and complete, now passes through a phase of prostration. Broncho-pneumonia is the most severe complication in 18 cases of which there were 5 deaths." This unit had "received the worst cases from the wards of several field ambulances". "To combat the epidemic and to reduce wastage" D.M.S. Second Army set aside all clearing stations not specially occupied and these "became stationary hospitals for the reception, treatment and discharge to duty of these cases". As these filled "all the tentage we could spare were given up to these cases—the acute medical ward took broncho-pneumonias, 3 tents equipped with stretchers took purely pyrexial cases", and a large store tent was allotted for convalescents.

In July the diagnosis P.U.O. was cut out in this unit.¹⁵

¹⁵ By a new and keen O.C. Maj. H. H. Woollard. He wrote: "Efforts have been made to stimulate M.O.'s to diagnose their cases and avoid subterfuges such as P.U.O., N.Y.D.—not so much in the direction of accuracy of diagnosis as of increasing the observation of individual cases." At this time an officer of the American Medical Service (Maj. W. Fischel) was in charge of the medical ward. His opinion is recorded, that, "in a large per cent. of cases differential diagnosis between trench fever and other pyrexias . . . cannot be made with certainty at a C.C.S." without longer observation.

Influenza gives 255 of a total of 808. "The influenza epidemic has subsided and the amount of serious sickness diminished." In August "the number of cases diagnosed influenza steadily goes down but the duration of disability seems to increase". In September there is "very little of importance to report in connection with the medical work of the C.C.S. during the past month". "Debility had risen from a trifling matter to the second highest 'disease'."

October: the second phase. Here begins a vastly different tale. In the 2nd Field Ambulance "the epidemic form of influenza with respiratory complications accounted for a large percentage of the evacuations during this month". In No. 3 A.C.C.S. of 1,426 admissions for sickness 498 were for influenza.

These (says the unit's war diary) at first were admitted generally as P.U.O., being cases of pyrexia with prolonged convalescence often followed by debility. Quite a number were admitted for diarrhoea. The type of disease is much more serious, toxæmia marked, patients peculiarly "dozey" with frequent pneumonia of a catarrhal type and tendency to marked cyanosis, delirium and low temperature.

From among the men of the unit itself there were only 14 admissions from influenza "not of a severe type", and general health "remained good"—as, it may be noted, it did in that unit throughout the epidemic.

At the General Hospitals. At the end of October the Australian Corps moved out of the line to the Abbeville area, and its experience in this phase is reflected in the records of No. 3 A.G.H.¹⁶ which like all the other Australian General Hospitals, bore a full share of the tremendous labours and strain imposed on the medical and nursing professions throughout the world by this gargantuan parasitic debauch. A report from No. 3 A.G.H. (written by Major F. B. Lawton) says:¹⁷

¹⁶ The experiences of No. 3 A.C.C.S. which accompanied Fifth Army to Cologne may briefly be noted. In December admissions for influenza numbered 162 out of 619; in January 285 out of 772, with 11 deaths. In February "influenza with or without complications accounted for the bulk of admissions. . . . At Cologne a very virulent type of the epidemic raged. Of 13 deaths 12 were from influenza, admitted under a great variety of diagnoses—P U.O., influenza, bronchitis, tonsillitis, diarrhoea, pleurisy, appendicitis, gastritis, rheumatism and pneumonia." In March and April influenza still provided the bulk of medical admissions, "with a recrudescence of pneumonia of the catarrhal type so fatal earlier in the year". In May the unit entrained for Le Havre and England.

¹⁷ One of the best accounts of the epidemic in a single article is that by an Australian medical officer, Maj S. W. Patterson (late Director Walter and Eliza Hall Institute of Research, Melbourne) who at the time was working in a British

Cases of influenza usually mild were seen at times from the opening of the hospital in France. At the end of February 1918 there was an outbreak of influenza among the orderlies of the hospital. This was not severe though the men were very sick for a few days. It was not till May 1918 that we had many cases, though there were a few in April and there were some broncho-pneumonias of which delirium was a feature . . . Each patient had a card attached at the field ambulance stating that he was not to be evacuated (because of the apparent mildness of the disease). Most of these cases were not very severe. Some of them developed broncho-pneumonia.

After this wave, which subsided about the middle of July, there was a period in which we had only occasional cases. This lasted till September 9th, when we received a batch of patients from the Australian Corps School at Rue on the coast near St. Valery. All were very sick on admission, and some of them had broncho-pneumonia and the others all developed it, and six of the first thirteen died. They were all seen by Sir John Rose Bradford. In the next few days others came from the same place with the same condition, and soon cases came from other places. Ward after ward was taken for these patients, till in October we had in H Block one ward of 30 beds and 4 wards of 44 beds each full of broncho-pneumonia patients . . . On September 29th there were 1,647 patients in the hospital. In October two more large wards—Adrian huts of 48 beds each—were taken and filled with cases of broncho. During December the numbers decreased a little, but it was not till January 1919 that the numbers became small, and, though there have been a few recurrences, it has not been necessary to isolate more than two wards at a time.

When the epidemic was at its height the whole staff had to work hard, the Sisters hardest of all . . .

The following are the figures (for this hospital) for the months of September to December, when influenza and broncho-pneumonia were most severe.

	Sept.	Oct.	Nov.	Dec.	Total.
Total sick admissions . .	1,161	3,186	3,107	2,257	9,711
Admissions—influenza . .	183	1,252	1,334	540	3,309
Deaths—influenza . .	4	80	134	20	238

In the A.I.F. Depots in Great Britain the epidemic followed much the same course as in the civil community in Britain, but it seems to have begun earlier. The following account is an epitome from the full and accurate records kept by Colonel McWhae as A.D.M.S.:

unit in Rouen. Writing in *M.J.A.*, 6 March 1920, he says of the first outbreak: "We had read of the spread of the so-called Spanish Influenza in the newspapers, but our first contact with it in Rouen was the arrival, in April, of a hospital train from Italy. . . . Most of the R.A.M.C. personnel and patients had suffered during the journey from a three to five-day fever of great contagiousness. Several were admitted for investigation . . . on Thursday to No. 25 Stationary. . . . On the following Sunday afternoon I found that 26 orderlies, several nurses and five medical officers including the whole of the laboratory staff had been taken ill on the previous days. Lt-Col C J Martin, in his indefatigable way, was carrying on the investigation although suffering from a severe attack."

The only other period (than the winter of 1916-17) in which there was serious menace to the health of the troops was during the influenza epidemic of 1918-19. Owing probably (*sic*) to the fact that the personnel in A.I.F. depots was always rapidly changing, influenza attacked the troops in three distinct waves, with a well marked interval of freedom between each wave. The following schedule describes the epidemic:

Out-break.	No. of Cases.	Duration	Average Strength.	o/oo Troops Quarterly	Respiratory Complications.	Deaths.	% Case Mortality.
1.	3,324	9 May-8 Aug. 1918	34,200	97	6 per cent.	10	0.3
2.	4,424	19 Sept.-3 Dec. 1918	38,000	116	11 "	113	2.55
3.	1,766	16 Jan -20 Mar. 1919	38,100	75	12 "	80	4.5

The first (summer) outbreak was due to a mild form of influenza, the second and third to an extremely virulent form in which the rate of incidence was kept down only by the enthusiastic co-operation of all ranks both combatant and medical. The type became progressively more virulent; but during the last wave of the epidemic a thousand soldiers were arriving from France every second day, and the journey to England in very cold weather, sometimes in crowded and comfortless cattle trucks may have lowered the resistance.

Prophylaxis. In view of the large numbers exposed to risk in the constantly changing population of the depots the results achieved by the vigorous steps taken were remarkably successful. The use of prophylactic vaccine is examined elsewhere, but the following is an epitome of McWhae's account of the other measures:

In the first epidemic to decrease the risk of infection in huts 15,000 soldiers were placed under canvas, not more than 6 men in each tent, and all were well aired once daily. In this way the number of men in the huts was much reduced. In the later outbreak it was not possible to carry this out, but the ventilation in huts, canteens, and so forth was rigidly enforced and crowding prevented. During the height of the epidemic, public places of amusement were put out of bounds. In the huts the men slept with feet and head alternating and gargled pot. permang. (1 in 5,000 of normal saline) which was also sniffed through the nose. Blankets of cases were sterilised and contacts were kept from public resorts for three days.

"General instructions" warned all soldiers against "allowing themselves to become chilled when cooling after exercise. . . . The matter is one of commonsense. Soldiers undergoing severe exercise should not be over-clothed but they should put on any additional clothing when the exercise is finished." Definite arrangements for hot meals were made, "the supper meal to be procurable at a fixed hour". An order specifying the

early symptoms of influenza, and instructing officers, N.C.O's, and men to report for medical examination immediately they noticed any of these symptoms, was read on Company parade daily and a copy posted in each hut of the Command. Medical officers were required to admit to hospital every soldier whose temperature was above normal, and combatant officers were made responsible for reporting to the R.M.O. any soldier too ill to attend sick parade; he was to be seen at once by the R.M.O.

Transports to Australia. A most important and difficult problem was that of preventing outbreaks of influenza in the troop transports to Australia carrying invalids¹⁸ and, after the Armistice, in those repatriating the rest of the A.I.F. The whole subject of transportation, however, is dealt with in a later chapter. The dramatic circumstances of the influenza epidemic as experienced by the Light Horse in Syria have been described in *Volume I*.¹⁹

The specificity of a "disease" may be determined by a constant clinical syndrome and pathology; a homogeneous pathogenic agent; or an identifiable epidemic distribution. The specificity of influenza still rests almost wholly on the last.²⁰ The difference between a case of the early "three-day fever" and a fulminant case in October—in which men were felled with an overwhelming toxæmia and became livid and died within 36 hours or, after recovery from widespread pneumonia and the brink of death, might stay crippled for many months or for life—could not be adjusted by clinical discrimination either at the time or now. In the lack of a specific pathology or pathogenesis, identity could not be fixed by laboratory analysis. There remain the epidemiological features of the disease and the fact of a

¹⁸ The appalling possibilities presented by such an occurrence is illustrated by American experience. "On September 16th the *Nestor* shipped 2,807 troops. On the second day out influenza began to appear and the following day she put into Nova Scotia and landed 660 men including all sick and contacts. Over 1,000 more were taken ill between here and Liverpool, of whom 240 had broncho-pneumonia, 17 died at sea, and others were landed in a dying condition." (Herringham, *loc cit*) The experience of the *Olympic* early in October was even more tragic, 141 out of the 5,600 troops carried having died during the voyage or on landing, or within two days of their landing in England—a case mortality of 6 per cent.

¹⁹ p. 735 and elsewhere

²⁰ Amid much other evidence may be noted the fact that only two deaths from influenza are recorded of the Light Horse. The War Office issued a general letter on the identification of influenza as a cause of death in pneumonia. Herringham (see *B.M.J.*, 1 Apr 1919) sums up thus—"Looking back at the 5 years of war it seems to me that the cases we have been calling influenza this winter are of the same character as those we have seen in most previous winters . . . and when I recollect the epidemic of 1889 . . . I am very much tempted to ask whether the present disease is influenza at all . . ."

gradual clinical merging of the first type with the second. The symptoms of the disease in its first phase and its merging with the second have already been described. No attempt can be made to present a comprehensive clinical picture of the complex of morbid states encountered in this second phase.²¹ The following descriptions of the "malignant" type are from Australian records:

Clinically the most noteworthy features were the tendency to haemorrhage, including epistaxis, haematemesis, blood-stained sputum, which was usually profuse and watery, profound toxæmia and little evidence of consolidation of the lungs (Major S. W. Patterson, *M.J.A.*, 6 March 1929).

The report of the Medical Officer, No. 3 A.C.C.S. says: Two types of case were recognised

(1) Those with frank pneumonia, nearly always of lower lobe and generally bilateral, with little or no cyanosis, with high temperature, ending by crisis or lysis with general improvement on the fall of temperature. These are very severe while they last, and some are probably ordinary croupous pneumonia. The sputum is usually rusty and viscid. These cases do well, and compared to the next group cause little anxiety.

(2) Men with bad colour, either distinctly blue cyanosis, or dusky, often without any definite physical signs of consolidation, dull to flat on percussion, especially behind, some râles or fine crackling crepitations and diminished air entry with weak or absent breath sounds. Pyrexia moderate or for a time high and falling without improvement in the general condition or physical signs.

Some of these have no sputum, others develop a profuse purulent sputum—I think often when improving—others a haemorrhagic sputum, while in others in whom consolidation appears, a rusty pneumonia sputum is seen. These cases may continue cyanosed, without developing consolidation and with chiefly negative signs, and die. Others hang fire, as it were, for a time and gradually recover, others develop deep patches of consolidation and increase in râles, the consolidation gradually increasing, often involving both lower lobes, usually unequally, and part of the upper lobes, with râles present all over front and back. The temperature may fall and the progress of the disease continue, until the patient finally succumbs from exhaustion or toxæmia. A particularly bad case is the man with pallor and lividity of the lips and ears and pinched appearance; these closely resemble the picture of cases poisoned with phosgene gas. Many of these cases appear to be deprived of oxygen and the lower part of the chest may be noticeably indrawn with the respiratory movements. I have several times noticed a cyanosed face clear temporarily and become pink after the propped-up patient has coughed and taken a few deep inspirations.

One is impressed with the feeling that the course of the disease

²¹ Curiously enough, this has been accepted as typical of the "influenza" of 1918-19 though as will be seen the clinical syndrome and the underlying pathological changes depended chiefly on the nature of the various symbiosing agents that were the cause of the respiratory complications found in influenza, in common with measles, and probably other virus diseases, met with in training camps in the war.

and the result is dependent largely upon the toxæmia. This may be intense, as in the fulminating cases which die before the development of definite physical signs, or it may so sap the patient's strength as to leave him unable to recover when the disease has apparently burnt itself out, and the physical signs have apparently begun to improve. The pulse often keeps comparatively good until nearly the end, and I have seldom found definite evidence of marked dilation of the heart. The pulse is often noticeably slow for the temperature. In a few cases the morning temperature is higher than in the evening.

Cyanosis. Of this extraordinary and dreaded sign Herringham writes thus:

In many cases the patient was admitted in a state of cyanosis which was not accounted for by the physical examination of the chest . . . I have never in my life seen anything like the picture presented. Entering a ward you might see 6 or 8 of these cases, some heliotrope, as it has been well called, others really purple yet not appearing as much distressed in their breathing as from their colour you might expect. . . . I do not know the explanation. It did not seem to me that there was in these cases such failure of the circulation as would account for it. . . . In some cases the same may be truly said of the state of the lungs. The condition of congestion with oedema seen in others recalled phosgene poisoning.²²

Investigation of the morbid anatomy of a disease, that is to say the departure from structural normality induced in the subject by the *materies morbi* has two purposes: to explain the physical signs and symptoms; and to ascertain which particular cell-complex, system, organ or tissue is the physical or chemotactic *point d'appui* of the "object"—i.e. the parasite or its toxin—or of the tissue reaction of the "subject".

In the influenza of 1918-19 the task of elucidation that faced the pathologist was a truly appalling one. In the first place, save that it was known to be parasitic and alive the cause was hypothetical; as to whether the pathogenic agent generally accepted—Pfeiffer's *B. Influenzae*—was in truth responsible, scientific circles of the profession were seriously sceptical. Second, and consequentially there was no criterion, clinical or pathological, to discriminate any specific disease at all. That out of this chaos, and in the dust and heat of the supreme crisis of the war, the medical profession of the world should have reached an understanding which subsequent research has

²² Professor J. S. Haldane, F.R.S., suggested (*Brit Medical Journal*, 15 June 1929) that the coloration might be due to meth-haemoglobinaemia

confirmed, is an evidence of rational poise that gives hope for humanity.

In a considerable proportion of the cases *coming to post-mortem* the evidence of damage entirely or mainly obscured that of any reaction²³ and, when present, the latter covered the whole gamut of tissue reaction found in acute disease of the respiratory tract. The dominant feature was haemorrhagic and serous effusion. The following description is compiled from the notes of a number of medical officers of the A.I.F.²⁴

Frothy, sanious fluid was often exuding from the mouth and nostrils. When the thoracic cavity was opened it was seen that the front of the turgid lungs was pushed upwards, usually full of air and crackling. Rupture of the air vesicles had taken place in many cases leading to patches of acute emphysema beneath the pleura. Frequently there were small areas of sub-pleural haemorrhage. Some cases showed recent soft fibrinous adhesions sometimes very dense, and in tearing through them blood-stained fluid exuded from the mouth and nostrils, as it was expressed from the lung and bronchioles.

The most striking feature was a general engorgement and water-logged condition of the lungs.

Microscopically the capillaries of the pleura, alveoli, and bronchi were engorged and often ruptured. The alveoli were full of a homogeneous, coagulated, albuminous exudate, often containing blood, and in the more affected parts leucocytes and endothelial cells.

To this primary inflammatory slimy oedema and congestion were added the following types of broncho-pneumonic involvement: (i) Peribronchial type; (ii) The usual broncho-pneumonic type; (iii) Purulent bronchitis; (iv) Acute emphysema. Protean combinations of the pathological conditions thus outlined were sometimes found throughout the lungs.

The following independent account is epitomised from *Medical Research Committee Report No. 36*.

62 cases. Pharynx congestion was common, sometimes purple coloration was found here, as also in the larynx. Tracheal inflammation was always present, sometimes intense. Contents were usually frothy fluid, on the pleural surface superficial haemorrhages were common. Thin fibrinous pleurisy was often seen—it was dense over areas of pneumonic consolidation. In the lungs “very striking changes were found”. These are summarised as (a) “oedema”, (b) “gelatinisation”, (c) haemorrhage, (d) broncho-pneumonia, and (e) abscess (3 early cases).

It was found possible to relate some of these to physical signs, but not usually. Of the first type “the affected area is firm, heavy, crepitant;

²³ Compare influenzal “pneumonia” of the toxic type with that produced by phosgene. (*See Chap. i.*)

²⁴ Maj. S. W. Patterson, Capt. J. I. Connor, Maj. C. H. Kellaway, Maj. W. Keith Inglis, Dr E. Marjory Little and Sister F. E. Williams

on section no consolidation, cut surface pours out frothy brownish fluid; no pus". The gelatinised lung was thinly coated with fibrin; on section the lung was red, homogeneous and glassy, with excess of fluid and nearly airless. Broncho-pneumonia and capillary bronchitis were common in all grades in late cases. Miliary broncho-pneumonia occurred in four cases.

Captain Connor's histological investigation included the areas of haemorrhage, of broncho-pneumonia, of oedematous pneumonia, of grey hepatisation and of areas of solid but "dripping" lung. In general the picture presented was that of an "acute haemorrhagic inflammation with toxic spoiling of the capillaries" passing through all grades of reaction to a typical broncho-pneumonia. In general there was little leucocytic invasion of the alveoli, in which endothelial cells were more common. Haemorrhagic and oedematous areas, grey hepatisation, and broncho-pneumonia might all be found in the one lung.

For the elucidation of the aetiological conundrum presented by this clinical and pathological anarchy three lines of enquiry were available: *pathological research*, *epidemiological reasoning*, and *clinical analogy*. The first has given us the "open sesame" to a final, if still far off, solution. But the other two made material contribution.

Epidemiology. Any exact epidemiological study of the disease was vitiated, first by the fact that no exactly definable "disease" existed, and second, that of the syndromes in which the outbreak showed itself only the pneumonic complications were notifiable in any civil community.²⁵ Army figures however gave a clue to the incidence of the general morbidity. Numerous observations confirmed the generalisation that the incubation period of the mass disease was from 24 hours to a few days. Many careful observations in most armies determined that men who had suffered from influenza in the first phase obtained a degree of immunity to the second, but that after a brief time limit, it was at best relative. On these facts and the features of the epidemic curves Greenwood endeavoured to "ground some hypo-

²⁵ Statistics of morbidity, except of notifiable diseases are practically unobtainable for civil communities save for certain selected bodies or industrial groups which seldom are suited for statistical generalisation. It has been found impossible for example to compare Australian civil and military sickness. See Chapters xv, xvi, xvii.

thesis of the biological factors responsible" for epidemic influenza. The premises he set out as follows:²⁶

We may lay it down that the realization of an epidemic demands three essentials—namely, an infectable subject, an infective object, a favourable environment. (a) *The object* is in general organized; under constant environmental conditions it will tend to pass through a cycle of changes expressing themselves by means of different effects upon the subject, and these changes may be hastened or retarded by variations of the common environment. (b) *The subject* being necessarily a living creature, is, *mutatis mutandis*, susceptible of changes congruent with those just predicated of the infective object.

(c) *The environment* must be understood to comprise not merely the direct reactions of say, climatic or economic conditions upon the subject and object, but also the effects of the morbid evolution upon both, together with the results of interference *ab extra*, for instance, in response to the activities of sanitary administrators.

On these premises and certain figures, military and civil, a tentative deduction was reached:

While the actual forms of the waves are plausibly explained, either by intra-epidemic changes of infectivity due to the parasite or by varying susceptibility, the fact of our having such waves at all in this year, and not having them in previous years, is attributable to the existence of a double periodicity to be referred to the coexistence of two distinct strains of infecting organisms or, if the reader prefers, two armies of infecting organisms, which may or may not possess a bacteriological specificity.

The proposal, *prima facie* "suggestive" that the pandemic was caused by the "augmented infectivity of the organism induced by the herding together of young susceptibles" was negated by the fact that "in point of time" (as it appeared) "influenza became epidemic in neutral countries before those at war were affected". The possibility that "a considerable number of epidemic manifestations during the past decade were really epidemiologically regarded influenza" was tempting but might "lead us into greater difficulties than it escapes".

The situation in 1919 was summed up by the statement that, from the epidemiologist's point of view, "much further investigation" was needed "before we shall have a clear view of the problem".

Clinical analogy: endemic influenza, measles and some

²⁶ From paper read by Capt. M. Greenwood, at Joint Meeting; sections of Medicine and Preventive Medicine and Pathology (British Medical Association, 1919).

others.²⁷ Apart from "lobar" (pneumo-coccal) pneumonia—a distinct and clear-cut disease entity with a history of its own—the whole problem of infective disease of the respiratory tract in the war hinges on the question what did "influenza" mean. In the records prior to the pandemic, influenza presents itself (1) as a fairly constant cause of local wastage from a non-descript congeries of pyrexia, corresponding more or less to the pre-war idea of "influenza"; (2) at camps of training in outbreaks, approaching an epidemic incidence, of grave and fatal disease of the lungs, in which measles, rotheln, and influenza were associated with a great variety of morbid states of lungs and pleura. These comprised the following conditions:

(a) *Pleuro-pneumonia*. In Australian experience such an outbreak occurred in 1914-15 in the Mena camp and has been described in *Volume I*. It was associated chiefly with measles. The most characteristic feature was a fibrinous pleurisy, so dense that it gained a local name "the Mena Shawl". In these cases besides the pneumococcus the bacillus of Friedländer was prominent. "Influenza" was not regarded as a factor of any significance. Streptococcal infection was infrequent.

(b) In British Command camps at Aldershot and also in France there were identified²⁸ local epidemics of a very fatal and apparently specific condition "*purulent bronchitis*". The *British Official History* accepts this disease as identical with some elements in the disease mass of "pneumonic influenza". Whether they were indeed "influenzal", and, if so, why they remained isolated, remains for the future to show.

(c) The history of respiratory infections in the American camps of training is of extraordinary interest. Very extensive and fatal outbreaks occurred. The outstanding feature of these was at first (end of 1917) the occurrence of epidemics of *pleuro-pneumonia* and *empyema* associated with measles. The clinical picture is strikingly reminiscent of Mena. For the most part a broncho-pneumonia, purulent bronchitis or empyema

²⁷ The chief sources of information under this heading are the records of the A.I.F. that deal with the outbreak of respiratory disease at Mena (1914-15); the *Review of War Surgery and Medicine, A.E.F.*, and *Vol. IX, Official Medical History, U.S.A.*, which deals with the camp outbreaks in America; and the *British Official Medical History, Pathology* dealing with "influenza" and "purulent bronchitis".

²⁸ See *Lancet*, 8 Sept., 1917 "Purulent Bronchitis; its Influenzal and Pneumococcal Bacteriology" by Aldophe Abrahams, N. F. Hallows, J. W. H. Eyre, and Herbert French.

is imposed on the specific disease. But here, in particular, the streptococcus group emerges and comes to dominate the situation. So definite was this invasion that special wards were set apart for measles cases in which haemolytic streptococci were found in the throat. The outbreaks in different camps had apparently no connection with one another.

Investigations of the maladies prevalent in camps in the past winter (1917-18) revealed the streptococcus as a widespread invader and the cause of many conditions in which we have hitherto believed it played only a minor and secondary role. Moreover it seems to incite conditions having a fairly precise clinical prognostic and anatomical picture so as to be quite readily distinguishable from similar conditions due to other micro-organisms.²⁹

At the end of 1917 in America, against this background, influenza emerges, and, in the second half of 1918, the haemorrhagic type of lung infection. It is difficult to escape the conviction that, in America also, the pandemic owed its specific character to the unknown factor rather than to the symbiotic microbes, whether Pfeiffer, streptococcus, or other.

Respiratory infections in camps of training. The camp outbreaks of respiratory disease in various armies present such striking analogies as to compel the conviction of some common aetiological factor beyond the occasional coincidence of infective agents. Integrating A.I.F. experience with that of other countries, the picture emerges of intimate and complex but exactly apprehendable mass-interaction between the infective object and the infectable subject. Environmental factors, largely controllable, seem to have determined the issue. On the side of the agent, the extent of the attack depended on diversity of method, ability to seize the day, to exploit success with augmented virulence, and so forth. The subject defended himself with biological, instinctive, and rational reactions, varying with race, experience, and culture. Medical science has so far advanced in knowledge that the clash of these forces in the environment of military camps can now be followed with much exactness. In the crowding, cold, overwork, dissipation, change of diet, dirt, promiscuity, and so forth we can note, *pari passu* with the coincidence of some virus infection, the emerging of one or more "facultative parasites", the identity of which will depend largely

²⁹ Article by Cole and MacCallum: *Journ. A.M.A.*, 20 Apr. 1918. Quoted from *Research Society Reports*, Vol. II, published by American Red Cross Society.

on the coincidence of its saprophytic presence in those subjects first or most severely exposed. Apparently it assumes pre-eminence in virtue of the impetus gained by precedence, and also by the increase of virulence with successful passage.

Pathological research. The clinical syndrome characteristic of bacterial diseases is not grossly pleomorphic. It was inevitable therefore that in the study of *influenza* scientific physicians should have been profoundly dissatisfied with the obscurantist effect of a family name and an accredited organism as a cause.³⁰

The dissatisfaction was expressed in the early years of the war by the creation of "P.U.O." as a substitute for "influenza" as an interim diagnosis; in the last year of the war it was evident in the manner in which medical scientists leapt at the opportunities for study offered by a pandemic of the real disease. Within an hour after the arrival of the first batch of Spanish influenza at Rouen an intensive research was begun into its bacteriology by the Adviser in Pathology A.I.F., Lieut.-Colonel C. J. Martin.³¹

The same thing was happening throughout the B.E.F. and in every national army. Experimental research quickly followed, and was continued throughout the epidemic. If the circumstances and competing interests are considered, the bulk of this research was prodigious, and the results must command admiration. The Australian Medical Service was in the centre of this research and a note upon it is therefore not out of place.

The case for Pfeiffer's bacillus. Until the advent of the three-day fever, "influenza" had received during the war no more scientific or critical attention than in the pre-war years. It was accepted as a diagnosis which did not involve scientific discrimination—at best a clinical nondescript. Purulent bronchitis had been studied and an epidemic tendency observed. The first reaction to three-day fever was to search for Pfeiffer's bacillus and with much success. Thus at Rouen it was found in nearly every case, and a definite relation was established with the course of the disease and evidence of phagocytosis. In the then prevalent worship of laboratory research, the discovery of this

³⁰ The position of the clinical influenza in 1918 was not unlike that occupied by rheumatic fever to-day. The *B. Influenzae* of Pfeiffer had a standing akin to, if perhaps more secure than, that of the cocco-bacillus of Poynton and Payne.

³¹ At this time Col. Martin was stationed at No. 25 British Stationary Hospital and engaged on his important work on dysentery.

organism was made the final diagnostic criterion of influenza. When it appeared to be absent, this was attributed, often correctly, to the technical difficulties of its isolation. But in general the verdict was that pronounced by Colonel Cummins in the *M.R.C. Report No. 36*: "not only is *B. Influenzae* present in nearly every case but it tends to invoke immune responses early in the disease".

But as the pandemic developed the pathological picture became more and more confused. Many skilled observers failed to find Pfeiffer's bacillus; negative findings were recorded in September 1918 by Kolle and even Pfeiffer himself. Other organisms were found to predominate. In particular from America came amazing reports of extensive epidemics of broncho-pneumonia and empyema in which the streptococcus group played a dominant rôle, both independently and as a symbiotic especially in measles and "influenza". It became obvious that, if any single organism was the determinant of the disease, the clinical features of the pneumonic type involved several organisms beside Pfeiffer's bacillus. This suggested the presence of a master agent which caused the type disease and opened the way for symbiotic invaders. Many still believed that this was the rôle of Pfeiffer's bacillus.

Search for a "filter-passer". The existence of disease due to ultra-microscopic or filter-passing agents had been known since 1898 (Foot and Mouth Disease). The long search for such a cause of the "common cold" had begun—founded on the technique created by Noguchi in his research on infantile paralysis. Three teams tackled the problem of influenza on these lines: Nicolle and Lebailly in the Pasteur Institute; Rose Bradford, Bashford and Wilson at Etaples; and a team, selected by Colonel Cummins in the laboratory of No. 3 A.G.H. The officers here chosen were Major H. G. Gibson, R.A.M.C., Major F. B. Bowman, C.A.M.C., and Captain J. I. Connor, A.A.M.C. Each of these teams obtained positive results by the inoculation of monkeys and other animals with filtrates and direct suspensions of mucus from influenza patients. Their finding that the disease might be communicated to animals was accepted provisionally by British and French bacteriologists, but with strong reservation in respect to specificity. The English observers identified certain minute but microscopic organisms;

these they sub-cultured and with them produced haemorrhagic pneumonia in monkeys and mice. The Interallied Conference in 1919 in its "provisional conclusions" set out:

We have as yet no precise knowledge as to the causal agent of influenza. The cocco bacillus of Pfeiffer is almost always present in the excretions and around the lesions of influenzal broncho-pneumonia; but it is also found in the bronchial excretions of many subjects attacked by various affections besides influenza. Doubtless it plays an important part in the primary complications, but it is not the specific agent of the disease. It is probable that the specific agent of influenza is an ultra microscopic virus, capable of passing through filters of porous porcelain.

Repetition of these investigations in America and Japan were negative; and, so far as concerns the virus cause of influenza, here the matter remained until the historic and far-reaching discoveries initiated by Laidlaw and his co-workers.

The *British Official History (Pathology)*, written in 1923, sums up the case in favour of Pfeiffer.

The new outlook 1919 Our conclusions are. (1) that there is one common and original microbic cause of influenza; (2) that, if this be not the *B. Influenzae* of Pfeiffer, it is in the earliest cases constantly associated therewith (p. 454).

It was held that the lesions which the American observers and others had found associated with streptococci and other organisms "are not the lesions seen in uncomplicated influenzal pneumonia"; and that

a succession of lesions of the respiratory tract is recognisable in these influenza cases that is in itself absolutely specific. The individual lesions may not be specific but the succession and association are such as are peculiar to this one disease (p. 463).

Nevertheless many will prefer the statement of the case as set out by Colonel Cummins in the Medical Research Committee's report:

An analysis of the relation of the type of organism isolated to the type of lesion present does not reveal any features striking enough to definitely ascribe any type of lesion to infection with any one particular organism. An important factor underlying the production of secondary lung complications would appear to be the degree of injury to pulmonary tissues by the primary aetiological agent of the disease. The resulting areas of haemorrhagic oedema afford a ready portal of entry and ideal conditions of growth for the organisms already existing upon the surface of the respiratory tract.

The whole clinical and pathological picture becomes intelligible if we can postulate a primary aetiological agent acting locally upon the respiratory surfaces and generally through its toxic products in such

a manner as to prepare the way for invasion by the prevailing respiratory flora. The work of Gibson, Bowman and Connor at Abbeville and of Wilson at Etaples holds out a promise that this explanatory link may now be supplied.

The amazing chemotactic affinity of this virus for human protoplasm seems almost to rule out any rational means of prophylaxis. The following summary has been made of prophylactic measures taken or attempted in the war:

(1) *Administrative procedures.* While A.I.F. experience affords no precise evidence regarding the value of local *notification* and *isolation*, the view held by the A.D.M.S. A.I.F. Depots (Col. McWhae) that the infection was spread from man to man and that this fact should be rationally exploited seems thoroughly justified by recorded observations. Colonel Barber (D.D.M.S. Australian Corps) also believed that after the Armistice "the epidemic was to a great extent held in check" by the wide dissemination of the troops in the billeting area.

(2) *Direct measures* Gargles and sprays were used in the Command Depots but no good word has been found for the practice. The following from the *American Official History* is pertinent to the whole problem of respiratory prophylaxis "The actual mechanics of the mode of transmission of the virus of influenza is a point over which argument has taken place. There is to-day substantial agreement that the disease is transmitted from individual to individual, rather than by aerial convection. . . ." (*Volume IX, p. 111*). The suggestion is made that—

"The obvious fact that infective material is constantly sprayed into the air by the coughing patient, from which it is equally readily inhaled by those near by, has tended to render us oblivious of other possibilities perhaps as important. The rôle of the hand in the spread of these diseases has been emphasized, particularly by Lynch and Cumming . . . It is entirely probable that both methods play their part in the process."

(It may be noted that the War Office made regulations on these lines in connection with the prevention of C.S.F. and diphtheria.)

(3) *Specific immunity.* No aspect of this extraordinary pathogenic conundrum better illustrates the chaos that remained to be resolved than the results reported of the use in the war of vaccines containing *B. Influenzae*.³²

In the middle of 1918 the War Office commended the use as prophylactic of a mixed vaccine containing *B. Influenzae* 60 millions, pneumococcus 200 millions, streptococcus 80 millions per c.c. The results reported by various competent observers defy scientific explanation on the present hypothesis concerning the pathogenesis of the "disease".

*1. Leishman's summary of figures for troops in Britain.*³³

³² The question of the identity of the *B. Influenzae* as isolated in 1918-19 with *Haemophilus influenzae* of to-day would seem to be still a matter of some interest. Cultural methods varied much in the war as well as results.

³³ Col Sir W. B. Leishman. The A.I.F. experience is summarised on p. 218. The tables summarise figures given by Professor Alexander Fleming, in *Recent Advances in Vaccine and Serum Therapy*, p. 331. (London: J. and A. Churchill, 1934.)

			Incidence of attacks.	Ratios per 1,000 Pulmonary complications.	Deaths.
Inoculated	..	..	14.1	1.6	0.12
Uninoculated	..	..	47.3	13.3	2.25
2. Eyre and Lowe's figures for N.Z. troops in U.K.					
Inoculated	..	..	13.0	—	2.6
Uninoculated	..	..	41.0	—	22.0
3. Duval and Harris's figures (for patients inoculated with B. Influenzae 1,000, 500, and 1,000 millions).					
Inoculated	..	..	33.0	—	—
Uninoculated	..	..	433.0	—	—

The conclusion of the Interallied Sanitary Conference as to the value of inoculation may be commended as a model of scientific restraint:

Trials in preventive vaccination, bacteriotherapy and serotherapy made by various experimentalists have as yet given only imperfect results. It cannot be otherwise, since (the specific virus of influenza being unknown to us) these trials could be carried out only with various non-specific organisms, such as the *cocco bacillus* of Pfeiffer or pneumococci or streptococci, etc. Vaccines or sera prepared from those organisms act only on the secondary bacterial conditions associated with influenza."

As to the specific treatment of influenza³⁴ one observation made in the A.I.F. is strongly confirmed by wide contemporary experience, namely the value of *rest*. Within obvious limits imposed by circumstance, the less any case of influenza was moved the better. This factor, it would seem, might often determine whether the course of the attack was to be benign or malignant.

Treatment
Serum therapy. Favourable results in the treatment of the primary disease by serum from horses recovered from an influenza-like epidemic known as "la Gourbe", and of pneumonic cases by anti-pneumococcus and streptococcus sera, were reported to the Interallied Conference. This elicited from Dr. Martin, Director of l'Hôpital Pasteur, the question, "May not these results depend on some non-specific action of the horse serum itself?"

Vaccine therapy. The influence of vaccine on the recovery rate has been noted above under prophylaxis.

A brief note linking past with present will perhaps illumin-

³⁴ The extraordinary results recorded by E. E. Turner (*British Medical Journal*, 16 July 1927, p. 93) from saturation with Salicin has no reflection in A.I.F. records. American experience, in particular the work of Kanneval, on the treatment of streptococcus empyema is of first-rate importance. Briefly, by deferring operation and organising pre-operative treatment, a mortality of over 30 per cent was reduced to less than 5 per cent. (*See Amer. Off. Med. Hist.*, Vol. XI, *Surgery*, p. 285.)

ate the future. The post-war history of "influenza" is concerned with a series of epidemics of which Professor Alexander Fleming remarks

**Influenza
post-war**

it is true that epidemics labelled influenza occur, but there is no certainty that they are the same disease as existed during the pandemic which ended in 1919

In 1933 Laidlaw, Andrewes and Wilson transmitted from humans to ferrets a disease from which a virus was isolated, and strong evidence was forthcoming that it might be the primary infective agent in human influenza. At least there had been gained "a new starting point and new hope for the ultimate solution of the problem", and it had been brought within the range of experiment. The confirmation of the research in America, the discovery of a close immunological relationship with the virus of Shope's "hog influenza", and also the discovery of important symbiotic relations between that virus and a bacillus resembling Pfeiffer's *Bacillus Influenzae*, are now history. In 1935 Dr. F. M. Burnet working at the Walter and Eliza Hall Institute, Melbourne⁸⁵ isolated from a local epidemic a virus which serological tests identified with the British strain. He says:

The present report adds nothing new to the knowledge of the virus, but, taken along with the American findings, adds a substantial corroboration to the view expressed by Laidlaw and Francis, that typical epidemic influenza is a distinct disease entity due to one specific virus, the serological characters of which do not vary significantly from epidemic to epidemic or from country to country.

The history of the 1918-19 pandemic illumines the wide possibilities opened up by these discoveries; but it also suggests that this is the beginning, not the end, of definitive research. The autumn epidemic of 1918 has still to be explained.

Nothing is more striking (says the report of the Medical Research Committee whose team worked at No. 3 A.G.H.) than the unanimity with which all observers mentioned haemorrhage as a prominent feature of the disease in the autumn epidemic.

Whatever the *materies morbi* transmitted to the experimental animals at No. 3 A.G.H. may have been, the "disease" transmitted was clinically identical with "pneumonic influenza".

⁸⁵ *Medical Journal of Australia*, 9 Nov 1935, p. 651, also *Medical Journal of Australia*, 16 Nov. 1935, p. 687.

The production of haemorrhagic oedema is a constant occurrence . . . (in the inoculated animals) the lung haemorrhages form the essential pathological lesion.

No link up of the ferret or swine disease with "pneumonic influenza" can be complete which does not explain also this haemorrhagic diathesis as a constant symptom, the world over, of the pandemic disease, and seen in slight or moderate cases as well as in the most severe.

Duplicity of the diagnosis "influenza" tested by A.I.F. figures. The present writer found that a preliminary study of the Australian war-records relating to the clinical syndrome known as "influenza" in its endemic and epidemic forms, and especially a study of the views expressed at the Interallied Sanitary Conference of March 1919, tends to confirm his strong personal conviction based on war experience, that the endemic and epidemic elements in the sickness recorded in the admission and discharge books as "influenza" represented at least two distinct syndromes, probably reflecting a similar multiplicity in the specific extrinsic causative agents.

On this presumption the Australian statistical records were at first analysed to distinguish as epidemic (or "pneumonic") influenza the cases recorded in the minor and major outbreaks of 1918-19, relegating to a distinct class the "influenza" recorded of the years 1914-15-16-17. Though crude, this method of cutting the statistical Gordian knot would have much clinical justification. It had to be abandoned, however, in view of the uncertainty that surrounded the question and consequently both in the present chapter and in the general tables at the end of this volume (*Chapter XVII*) all "influenza" is lumped together as a "disease". The scientific impropriety of this is obvious, and the figures are given with this warning. (The relation between "influenza" and other respiratory infections is also shown.) The American figures given earlier in the present chapter form an interesting comparison. The German figures illustrate the very regular incidence of what we have termed the endemic influenza and the sudden onset of the pandemic disease.³⁶

The following table sets out the incidence of "influenza" in the A.I.F., and relates this to the various stages of the war and to other respiratory diseases.

Statistics

³⁶ American and German figures on p 196

Comparative table of A.I.F. admissions in France for Influenza, and for other Faucial and Respiratory Tract Infections shown by yearly periods from March to March with their comparative incidence.

Admissions to.	Influenza.				Other Respiratory.			
	1916-17	1917-18	1918-19	Total	1916-17	1917-18	1918-19	Total
Field Ambulances	6,304	3,922	11,721	21,947	9,186	6,434	3,733	19,353
Percentage in year	28.9	17.9	53.2	—	47.4	33.3	19.3	—
Cas. Clr. Stations	3,980	2,368	5,941	12,289	7,704	4,805	2,588	15,097
Percentage in year	32.3	19.3	48.5	—	51.0	31.8	17.2	—
Exp. Base Hospitals	4,214	1,517	5,351	11,082	9,140	3,851	3,785	16,776
Percentage in year	38.0	13.7	48.3	—	54.5	23.0	22.5	—
Evac. to U.K. ..	905	573	3,956	5,434	3,376	2,544	2,752	8,672
Percentage in year	16.8	10.5	72.7	—	38.9	29.3	31.8	—

The great drop in "other respiratory" in 1918-19—figure 19.3 etc., in penultimate column—would indicate:

- (a) that influenza was in effect epidemic throughout the war: or
- (b) that during the epidemic many diseases were called "influenza" that were not influenza: or
- (c) that there is a great mass of respiratory disease whose breeding, being unknown or promiscuous, is labelled by the symptom-complex that best fits its clinical manifestations; but that when a specific disease like influenza is discovered—or invented—there is a natural tendency in the medical profession to identify it more exactly than is justified.

Moral, why not "P.U.O." in civil practice?

The history of the epidemic in Australia is necessarily dealt with later in connection with the return of the A.I.F. to Australia and with the quarantine precautions taken there, with considerable success, to prevent or delay the entrance of the pandemic invader.³⁷

³⁷ This chapter is based, for the most part, on contemporary records of the 1914-18 war. It has not been brought precisely into line with present-day views. However, the facts and even the opinions recorded have a practical, as well as historical, interest in view of the possibility that the Second World-War pandemic may again be a respiratory infection. For the experiences of the Royal Australian Navy see *Chapter vii*.

SYNOPSIS OF CHAPTER V

THE SCIENTIFIC BACKGROUND OF ARMY MEDICINE IN THE WAR

THE SCIENTIFIC OUTLOOK IN 1914.

- (a) General.
- (b) In Australia.

GENESIS OF SCIENTIFIC MEDICINE IN THE ARMY.

- (a) In the British Army.
- (b) In the Australian Military Forces.

THE EVOLUTION OF MEDICAL RESEARCH IN THE BRITISH ARMY, 1914-18.

Structure of scientific medicine in the Army.

Clinical research

Administration of research.

The R.A.M.C. laboratories.

The Medical Research Committee

Agencies for dissemination

Individual.

Collective dissemination.

Publications.

Interallied Sanitary Commission.

The Annual "Conferences".

A HIGHLIGHT OF COMBINED RESEARCH—THE "DISCOVERY" OF TRENCH FEVER.

THE EVOLUTION OF MEDICAL RESEARCH IN THE A.A.M.S., 1914-18.

Scope and Limitations.

The Medical and Surgical Consultants.

The Adviser in Pathology.

Medical research in the Eastern Theatre.

Pathology—The Anzac Field Laboratory.

Pathology—Research at No. 14 A.G.H.

Clinical Medicine—The discovery of rectal Bilharziasis

Collection of Museum specimens

Medical research in the Western Theatre.

Pathology: The A.I.F. Central Laboratory.

The episode of Cerebro-spinal Fever.

A.I.F. Laboratories in France.

Bio-physical research: Problems of Flying.

Clinical Science: The Physicians in the A.I.F.

Surgery in the A.I.F.

Surgery in the Gallipoli Campaign

Surgery in the Palestine Campaign.

Surgery in the Western Theatre.

Collection of Museum Specimens.

CHAPTER V

THE SCIENTIFIC BACKGROUND OF ARMY MEDICINE IN THE WAR

THE scientific history of Army medicine in the War of 1914-18 is concerned with two spheres of experience, and two phases of time. The first sphere of experience is internal,

**The scientific
milieux
of 1914-18**

the Army Medical Service being a self-contained system with a scientific outlook and organisation—a *milieu intérieur*—of its own.

But it has intimate relation to a much wider sphere—the *milieu exotique*—of its scientific environment; the great world of knowledge and research lying outside its structure, uninterested in its activities, and to a great extent alien to its ideals and objectives. And the history of each of these spheres of experience is concerned with two periods—(a) the situation prior to and at the outbreak of the war, and (b) developments, especially internal, occurring in the course of that war and, in certain directions, after it.

“That blessed word” Science, and its even more sacrosanct derivative “scientific”, have reached—as the present generation

**Science and
medicine**

has come to discern—a phase of deification at which it is desirable to examine closely the form that they clothe. Is (men are asking) the unprepossessing body of Science (as applied, let us say, to war) the true form and substance of Science? Or is this garment but a verbal figment, a fetish, distorting not revealing the true form, of scientific “wisdom”? That as applied in war, “science”—speaking generally—is almost wholly destructive is not open to dispute. In the Great War medicine, almost alone among war’s exploitations of peace, was able to “save its soul alive” and, after some initial frustration, began to pick up the threads of peace-time scientific progress.

Though so short a time has elapsed since the outbreak of

the First World War, it is already necessary to remind ourselves that the scientific, as well as the social and the political outlook, have considerably changed since then. The war of 1914 came with the crest of a wave of technical "scientific" activity unsurpassed, probably unequalled, in the history of man's cultural evolution. In the particular region that formed the *milieu exotique* of the Royal Army Medical Corps and its Australian confrere, Pasteur (1822-95), Koch (1843-1910) and Lister (1827-1912) were only one generation into the past. In the cavalcade of comparatively recent events Jesse W. Lazear, with Reed (1851-1902) and Carroll, had sought and gained by the experimental bite from infected *Stegomyia* protection from Yellow Fever for humanity and death for himself;¹ Laveran and Ross had solved the puzzle of malaria; Almroth Wright, (1861-) had conducted his early studies in Australia and his later researches in China and England; these and many others had created lines of research which in the World War were to abolish typhus fever from the Western Front, control malaria and dispel the menace of typhoid. The enunciation of the abstract theory of the "closed benzene ring" by August Kekulé in 1865 was at once the inspiration for and the means of Ehrlich's creation of "606" and the Bordet-Gengou-Wassermann reaction. In yet another domain, that of "orthopaedic" surgery, despised and rejected of the orthodox surgeon, Hugh Owen Thomas (1834-91) of Liverpool, in 1875 in the wire frame of his "knee splint",² determined principles of surgery as fundamental as the law of gravity, and was to confer on the wounded soldier in battle benefits unsurpassed in the long history of medical aid in war. Herbert Page (1845-1926), of London, when in 1881 against bitter opposition, by the force of exact "scientific" observation and fearless deduction he dragged the subject of train-collision "shock" from the meaningless jargon of "railway spine" to the light of a scientific concept as a "traumatic neurosis" laid the foundations on which in 1920 were based the conclusions of the Royal Commission on "Shell Shock".

¹ Cf. p. 250—the unveiling of Trench Fever on the Western Front

² It is necessary to modify the statement made by Fielding Garrison—*Introduction to the History of Medicine*, 4th Edn. p. 792—which creates the impression that the Hodgen wire splint was used in every stage in the evacuation of men with fractured femurs. It was not.

None of these men—except, perhaps, Ross—could have conceived how vast a practical application was to be given to their observations as that which came in the war of 1914-18.

It will be noted that the science responsible for these advances had proceeded, as Western medical research had done since its beginning, along two distinct lines which to this present century have usually run separate though parallel—commonly distinguished as the *observational or clinical method* and the *analytical or laboratory*. The first, originally associated with Hippocrates of Cos, was a system of exact observation and record of the phenomena of health and disease and of the influence of external conditions and agents on individual and communal health—clinical medicine and epidemiology. The second was Aristotle's analytical method of investigation of individual structure and function, as applied to medical problems by "the first experimental physiologist" Galen. The tradition of British Medicine has tended to be clinical, though the maintenance of balance and a sense of proportion have always, perhaps, been its leading characteristics. Nevertheless the acceptance—as vital in medical history as the Renaissance itself—in the "germ" theory of Pasteur and Koch of a specific "cause" for plagues and diseases; together with the innovation of the "cellular" theory of structure of Schwann (1810-82) and Virchow (1821-1902), had brought a sweeping reversion to the analytical idea of science. Then in 1910 Ehrlich (1854-1915) created "606"; and the rising sun of bio-chemistry had appeared.

The great majority of "new diseases" discovered in the quarter century before the war were of bacterial or other parasitic origin, so that a bacteriological and pathological laboratory came to be looked on as almost *ipso facto* a research centre, and the bacteriologist and parasitologist a "research" worker. The expression "medical science" became in effect identified with some form of analytical investigation, and "scientific" discovery in medicine meant "laboratory" findings and "laboratory" research. It is true that since that time the aura of adventure has in a great measure been transferred to the bio-chemist and endocrinologist so that pathology, bacteriology and even

Observation

v.

Analysis

"Scientific research"

parasitology are becoming primarily diagnostic in function. But at the beginning of the war of 1914-18 the bacteriological laboratory carried such a halo of experiment that the liaison between the clinician, the pathologist and the bacteriologist was gravely defective.

There were it is true giants who envisaged medical science as one and indivisible; the writings of Osler (1849-1919) and Allbutt (1836-1925) are great for this reason. But in the main, contemporary literature not less than scientific jargon saw in the laboratory the authentic and only temple of "scientific" medicine. Not the least interesting feature of the history of war medicine is seen in the deliberate break-away from this fetish. It is of peculiar interest to Australia that among the early departures from it was the co-operation of clinicians and laboratory workers at No. 3 A.G.H. on Lemnos in 1915.

**The more
excellent way—
the scientific
clinician**

Australia, which is not even yet "on the map" of the world in scientific medicine, was in 1914 almost completely *terra incognita* save to a few specialists or post-graduate schools such as those of Vienna, the Mayo Clinic, London, and Liverpool. Yet by 1914 Australian medicine had become fixed as at least a cultural variation from the British School, with its own subvariants in the several medical schools, Melbourne, Sydney and Adelaide, each tending to breed true to type.³

**Australian
medicine
in 1914**

The generation of Australian medical men which in the 1880's and 1890's had graduated at Edinburgh, London, and in a less extent Cambridge, Oxford, Dublin and Glasgow, still formed the backbone of the consulting practice in the

³ Cardinal stages in its evolution are marked by the creation of Public Hospitals and Medical Registers; the formation of Clinical Medical "Associations"; the establishing of Professional Journals, the founding of Medical Schools, the successive extensions, in time and substance, of their curricula, the creation of new Professorial Chairs; the development of specialties within or adjuvant to the organised medical profession as nurses, opticians, pharmacists; the development of post-graduate study, the formation of museums, and of professional libraries.

Less tangible but not less important are the development of facilities first for the application, to general practice, of advances made in laboratory analysis—bacteriology, bio-chemistry, radiology—as distinct from clinical observation and clinical diagnostic technique. Lastly, but most relevant here, the creation of a spirit of and facilities for medical research. The outstanding exception to this steady progress in provision for medical culture was the gross neglect, save by a few enthusiasts, of medical historical libraries.

capital cities. In the Australian medical schools the professorial chairs of anatomy, physiology, pathology, were still being filled from overseas, though clinical chairs—medicine and surgery—were now generally regarded as a responsibility for men born and trained in Australia. They had from the first been filled by men of the kind that create traditions and impress their personality. If Anderson Stuart made the Sydney graduate the most enterprising and worldly-wise, H. B. Allen made the Melbourne student a student for life, and Joseph Verco impressed on the Adelaide school a fervour and scientific outlook and a professional standard which enabled the South Australian assembly to lead the way in the professional reaction to war needs. With the occupants of the other chairs these three leaders, each great in his own way, had created a matrix—imbued with the English and Scottish tradition but yet strongly individualistic—which itself, under the influence of Australian environment and isolation, had produced a recognisably Australian culture, supplying a training not only comparable with the best the world could give, but in some respects better suited than any other to the particular requirements of the community. In particular, perhaps, it was distinguished by the resourcefulness and self-confidence necessary in a country in which many practitioners had to rely on themselves far more than was usual in Europe—a condition that largely moulded the characteristics of the whole people.

The stream of Australian culture runs now deeply and strongly in a channel of its own creating, drawing inspiration and substance both from springs within itself and from the cultural deluge which to-day floods in from the thousand and one sources of universal culture. There is space here only to list a few names—selected from the more immediate past—of Australians, by birth or adoption, who by any yard-stick may be said to have played a significant part in the advancement of the medical science and art. Most of them had a direct, and all an indirect, influence in creating the scientific standards and inspiring the moral outlook of the Australian Army Medical Service. In alphabetical order may be named:

Harry Brookes Allen, Joseph and Thomas Bancroft, Peter Bennie, Arthur W. Campbell, Charles Clubbe, Thomas Fiaschi, J. Froude Flashman, George B. Halford, John Irvine Hunter,

Colin Mackenzie, Arthur E. Mills, William J. Penfold, George E. Rennie, Hamilton Russell, Arthur C. H. Rothera, Eric Sinclair, Richard R. Stawell, T. P. Anderson Stuart, John Ashburton Thompson, Herbert Henry Woollard—the list is made almost at random.

At the outbreak of the war *pathology* as a branch of medical science was in a state of transition. From the study of disordered form it was moving to the study of disordered function, from a record of final results to an index of vital reactions. With this change it was becoming fundamentally experimental, and this characteristic was already accepted as an element in the practice as well as the science of clinical medicine. This was markedly the case in Australia.

The birth and growth of this attitude can be followed very clearly in the writings of William Osler, and its onset is curiously illustrated in the ideas chiefly motivating the pathological outlook of the three medical schools in Australia. In the University of Sydney in 1914 the Professor of Pathology, (D. A. Welsh) was engaged in research into the biochemical immunity factors in the agglutination reaction. In the newly established pathological laboratory of the Lunacy Department of New South Wales the Director (Dr. J. F. Flashman) and Pathologist (Dr. Oliver Latham) were exploiting the possibilities of the Wassermann adaptation to syphilis of the Bordet-Gengou reaction of “complement deviation”. On the other side of the picture we find Professor Sir Harry Allen in Melbourne and Professor J. Watson in Adelaide immersed in pathological anatomy; and experimental pathology developed from the physiological side (*e.g.* by Professor W. A. Osborne and A. C. H. Rothera in Melbourne) and the biological (*e.g.* by J. B. Cleland in Sydney) reflecting the influence on general pathology of the new science of parasitology—the pathology of the protozoa and the metazoa.

In 1914 the British Association for the Advancement of Science held its annual meeting in Australia under the presidency of Mr. William Bateson, the leader of the “naturalist” school of biological research. Among medical papers of wide general importance Professor C. J. Martin, Director of the Lister Institute of Preventive Medicine, read one upon “Climate from a Physiological Point of View”, a circumstance

that links this meeting to the Australian Medical Service and to military problems.⁴

The war of 1914 found in the profession and medical schools of Australia not only physicians, surgeons, specialists, who would have held their own in any company, but also a body of young graduates capable of rising to any demand that the war could make on originality, initiative, and grounding in the qualities required for original research, clinical and analytical.

GENESIS OF SCIENTIFIC MEDICINE IN THE ARMY

The development of medical services in ancient armies is eminently relevant to the study of the medical history of modern wars. Here, however, it is possible and necessary only to point to the attitude of those services in earlier times towards the "science" of medicine. Until the advent of the Standing or the Conscripted Army military medicine had no independent scientific significance or status, or only during the course of wars of considerable duration (such as the Crusades or the Hundred Years War); and then was almost wholly occupied in the problem of wounds *per se*. Hippocrates counselled would-be surgeons to follow the wars and it is to war we owe the ligature. But scientific surgery has evolved not so much from the treatment of the woundings of war, as from the woundings of the crude early surgery of peace—not from the military surgeon but from the unorthodox practitioner who "cut for stone" and for hernia; the Army surgeon was concerned, not with a science but with a crude and even primitive technique.

Till towards the end of the 17th century medical science in the sense in which we have defined it seldom touched the Army save in the matter of surgery; and then its "science" was but little removed from bare technique until John Hunter made battle-wounds the "take-off" for the clinical and experi-

⁴ In 1913 there met in London the "17th International Medical Congress"—one of the greatest ever held. Representatives of 26 nations attended. Socially as well as scientifically the conference was an extraordinary success. One of the Secretaries to the Congress was Dr. H. W. Armit, who early in 1914 became the first Editor of the *Medical Journal of Australia*, the official organ of the British Medical Association in Australia (which combined earlier State publications). Its first number was published on 4 July 1914.

mental studies that made him the creator of scientific surgery. A material advance had come when in 1660 the Regimental system of the British Standing Army opened a military career to the medical graduate, and in 1742 a Fellow of the Royal Society and pioneer in preventive medicine (Sir John Pringle) became Physician-General of Army Medical Services. Pringle (as is well known) was not only the pioneer of scientific medicine in the Army but of scientific humanism in war. And when Napoleon made war a liberal profession Larrey and Desgenettes became pioneers in clinical research. Pringle, James McGrigor, James Lind (Navy) are names even more reputed in the history of civil than of army medicine.⁵

Yet even their studies were only incidental. The official relations between regular armies and their nations have always been more or less marked by tension. The sordid social history of the British Regular Army is in no small measure a reflection of the mistrust which from the beginning, in 1660, existed between the Parliament—and in a less degree the people—of Britain and the Standing Army.⁶ The creation of an Army Medical Corps (in common with that of a Service of Supply and Transport) was held up for two centuries by the “jealousy of Parliament and the prejudice of combatant officers”.⁷ The greatest modern advances began when in 1853-4 Miss Florence Nightingale, a nurse, demonstrated that the factors in *scientific medicine* in the Army did not differ in essentials from those in civil life, and so laid the foundation of practical preventive medicine in the British Army; and when in 1857 the principle of an *Army Medical Corps* was adopted in the

The Army Medical Corps

⁵ The *Encyclopaedia Britannica*, Vol. 15, p. 204 (14th edition) says: “*Military, Naval and Prison Medicine*.—During the 18th century the only sick of whom statistics were available were soldiers, sailors and prisoners. Thus the most important movements in preventive medicine, both in England and elsewhere, were initiated by naval and military surgeons.

“The experience and position as chief medical officer of the British Army of Sir John Pringle (1707-82) enabled him to get many of his reforms generally accepted. He was among the first to see the importance of ordinary putrefactive processes in the production of disease, and quite the first to apply these principles in hospitals and camps. He identified the deadly ‘gaol fever’ or typhus with ‘hospital fever’, and laid down rules for the hygiene of camps.

“The Scottish physician, James Lind (1716-94) had a long naval experience. In an important work on scurvy (1753), then a very common and fatal disease at sea, he demonstrated how it might be prevented by fresh fruit or lemon juice. Fresh water had always been difficult to obtain on sea voyages Lind arranged for sea water to be distilled for the purpose. . .”

⁶ See, in this connection, Fortescue, Walton, Clode, Firth.

⁷ See *The Royal Army Service Corps* by Sir John Fortescue, Vol. I, p. 265.

British Army.⁸ The influence of the latter reform was elemental—the medical service had now not only a soul to be damned but a body to be kicked. It developed *esprit*, and a sense of responsibility.

A century before, however, in a distant part of the British Empire there had been established by the East India Company an organisation which in its scientific activities long preceded the British service. This was the Indian Medical Service. Like most movements that have influenced the course of history it had its origin in necessity. The problems of health in the tropics faced the British Army scattered throughout the world. The Indian Medical Service was created when, to quote the official account,

**The Indian
Medical
Service**

The Bengal, Madras and Bombay Medical Services (I.M.S.) were constituted in 1764 to include all the surgeons employed by the East India Company. For short periods in 1766 and 1796, the civil and military branches were organised into separate services, but on each occasion were speedily reunited. The Presidency establishments were amalgamated as the Indian Medical Service on 6th March, 1896.⁹

The pre-war scientific history of the army medical services of the British Empire rests preponderatingly on the achievements of the Indian Medical Service.

Fielding Garrison says:

Tropical Medicine, vaguely rooted in antiquity, came into being largely through the exploration of the globe by navigators. . . . It owes its scientific status to the development of bacteriology, parasitology, protozoology, medical entomology, and medical micology. It had its authentic start with the organisation of the Indian Medical Service of the British Army (1764) and some of the best work done in the early period clusters round the names of Lind, Wade, Russell, Fayrer, Mac-Namara, Malcolmson, Corbin, Vandyke, Carter, Sir Leonard Rogers, and Sir Ronald Ross.

Meanwhile, though organisation in the British Army improved with the formation of the "Medical Staff Corps" in 1884 and "Royal Army Medical Corps" in 1898, scientific progress of the service was actually hampered by the "non-combatant" stigma created by the Geneva Convention, and it

⁸ The "Medical Staff Corps", comprising the medical officers, was not actually formed till 1884, and the Royal Army Medical Corps, comprising officers and men, not till 1898. (See *A Short History of the Royal Army Medical Corps* by Col. Fred Smith.)

⁹ From *The Indian Army List, April 1939*, p. 628. (New Delhi: Printed by the Manager, Government of India Press, 1939.)

was only slowly that it began to move in the currents that the Indian Service had helped to stir. Far from being merely a reflection of the medical profession and of the medicine of civil life, it was on the contrary a highly individualised and self-contained organisation, and one which until the present century lived mainly in a world of its own, with little contact with the stream of scientific progress, closely and inexorably discriminating in its reception of what served its purpose, and almost wholly oblivious to the duty or possibility of repaying in kind the gifts of scientific method and knowledge from which it had created its Frankenstein—a science and art of “military medicine”.¹⁰

The development of a scientific outlook in the British Army Medical Service was vitally helped by the creation in 1903 of the Royal Army Medical College and the provision, first, of a teaching staff of the highest quality¹¹ and, second, of opportunity for courses in special study in both clinical and analytical medicine as part of the normal life and opportunities of members of the service.

In later years before the war of 1914-18, as we shall see, the position had been greatly modified. Army doctors had led the way in various branches of scientific research, in a liaison with the civil profession which had been made possible by the birth of the Medical Staff Corps and its baptismal regeneration after the South African War at the hands of the Esher Commission. In this stage—following the fundamental work of the French Army surgeon, Alphonse Laveran, and that of the “father of tropical medicine”, Patrick Manson (who began his career as an officer in the Chinese Imperial Marine) the British Army contributes to science besides Ronald Ross such names as those of David Bruce (with his work on Malta fever and sleeping sickness), W. B. Leishman, and Charles Donovan, all of the Army Medical Service, and Robert McCarrison, whom Garrison calls “one of the last and best of the noble line of the Indian Medical Service”.¹²

¹⁰ A good example of this is the treatment of the statistics of the war. See Chapter XV.

¹¹ Thus Maj. (later Maj.-Gen.) W. W. O. Beveridge, professor of hygiene in the college was throughout the war A.D.M.S. for Sanitation, B.E.F.

¹² With several of these the Australian Service was to work in close relationship in 1914-18.

But it required the attrition warfare of 1914-18 fully to sheet home the fact that a modern medical service must be part and parcel with the scientific *corpus* of internationalised medicine. Even to-day the surgery of war is the surgery of the wound *qua* wound; and that, when all is said, is at best the handmaid of modern "scientific" surgery, whose purpose is not primarily to heal a wound but to prevent disease or promote its cure.

In Australia as there was no regular medical service, there was no authentic Australian tradition. Surgeon-General Williams, the first Director-General, was first and foremost a military officer; and in creating the Australian Army Medical Service¹³ his purpose was an efficient field service. The part-time officers who were Principal Medical Officers of the six districts and medical officers in the citizen force units, and from among whom the greater part of the first medical officers of the A.I.F. were drawn, were men with special training, and some even engaged in research. But at the outbreak of the war the notion of applying special medical research to the problems of the Army was quite outside the scope of its organisation.

An Australian, Major S. F. McDonald¹⁴ who served with the R.A.M.C. throughout the war has furnished an interesting summary of his experiences which has been freely drawn on in various parts of the present volume. He says:

To understand certain of the results produced on the R.A.M.C. by the war of 1914-18 it is necessary to remember the following facts.

1. The senior ranks contained many men who had joined the Corps at a time when its professional and scientific standards were low, and who were attracted by a steady rather than pleasant employment, a recognised social position, opportunity for sports and athletics and a certain pension at the end. There were brilliant exceptions—but they were exceptions and not regarded with great favour by their fellows.

2. Below these senior ranks came a series of "batches" (in Corps slang) containing men of undoubted scientific fervour who had in many cases followed the Army because it gave an opening to their scientific bent. Especially was that so in bacteriology and hygiene.

3. The pay varied not merely with rank but with office. An officer

¹³ See Vol I, Chap. 1.

¹⁴ Prof. S. F. McDonald, F.R.C.P.

commanding a medical unit drew not only the pay of his rank, or acting rank, but also "charge pay"—apparently to indemnify him for the trials and responsibilities of command. There was a further excellent system of specialist pay, by which men were encouraged to specialise in certain branches—e.g. surgery, bacteriology, ophthalmology—with the prospect of a specialist's post and extra pay, usually 2/6 per day.

Such a system worked well in peace-time. The officers commanding were senior men, to whom promotion came as the result of seniority. The specialists had to have achieved a certain length of service and have taken a special course of study; so they too had every prospect of gaining promotion and in their turn drawing charge and command pay though the system was too young for this actually to have happened.

With the advent of active service matters changed. At first there was a lamentable shortage of all medical officers, and junior officers were sent in as Regimental Medical Officers in spite of special qualifications.¹⁵ As the war progressed these men were as far as possible withdrawn from the front line and put to do their own special work. Later on, however, many new units were formed and brisk "acting" promotion took place, which of necessity had to be selective. The qualifications for commanding a unit usually did not include any special knowledge, with the result that the specialists found themselves passed over and their superior professional qualifications actually formed a bar to promotion. Thus, skilled bacteriologists were left in their original rank, with their extra 2/6 a day, while men who were their juniors and who had no such skill became lieutenant-colonels with an extra 10/- a day. Applications for advancement were met by the reply that they must do the special work for which they were best qualified; this was right and true, but very galling to the individuals concerned.

Partly because of the foregoing reasons, partly from the fact that, by the unskilled observer administration is more easily understood, there came about a worship of "administration" which did much to break the heart of the keen professional worker. Let a man's hospital or field ambulance be bright with paint, white-wash, gardens, gravel paths and tidy lockers—and he was marked for commendation, though his unit might be of the most secondary quality professionally.¹⁶

Furthermore there were certain leading members of the Corps to whom all "science" was anathema—in the words of one of these there was to be "no b—y research"—a phrase that later became famous.¹⁷ Others again held that the war was above all a war of research, and the M.O. not trying to do all the seeking after knowledge he could, was doing his best to lose it.

From the beginning of the war the permanent R.A.M.C. was diluted by the addition of "temporary" officers in ever increasing numbers.

¹⁵ E.g. Capt. H. S. Rankin, V.C., was a bacteriologist of great promise—he died of wounds whilst an R.M.O. In this connection the case of Capt. G. C. M. Mathison, A.A.M.C. may be recalled (*Vol. I, p. 157*). It is fair to note that the move for front-line service often, as here, originated with the officer himself.

¹⁶ Dr. McDonald adds: "The two sometimes were, however, combined, with great success. One unit stands out in my recollection for beauty, cleanliness, good administration and the eye-wash dear to inspecting generals, while its scientific work was second to none—and both drew their inspiration from the Commanding Officer."

¹⁷ The phrase was sometimes shortened to "N.B.R."

These were mostly of the house surgeon, or just ex-house surgeon type, and were drawn from all the medical schools. A certain number of recruits to the "New Army" were from the Special

**The civilian
invasion**

Reserve and Territorial Forces, many of whom excelled the Regular in zeal and enthusiasm and professional skill and not a few in military knowledge. They were obliged to go on service at the outbreak of war, and were paid worse and treated more hardly than the just-qualified temporary officer. The other non-regulars were (1) the junior temporary officers (2) the consultants. These two elements alone were sufficient to ensure a fire kindling, and the blaze once begun continued to increase till it reached its climax in the winter of 1917-18.

The consultants were men drawn from the great metropolitan and provincial teaching schools—men full of interest and scientific enthusiasm

The consultants

and of great practical patriotism, for they sacrificed much by coming abroad. Men of such assured position could meet the Army on perfectly equal terms. They were appointed to the Army, to Armies, and to Base Areas. Wherever they went they set up a high personal and professional standard and were able to rouse many a flagging spirit to renewed exertion.

It was in 1915 that this impulse—of the young and interested M.O. from below and the consultant from above, met and helped by the better type of regular—first began to make itself felt. 1914 had left us as it were gasping after the effort; the grim memories of our helplessness over those awful first streams of wounded—in goods trucks, among the straw, dying of gas gangrene, tetanus and secondary haemorrhage—pursued us into the winter with the first and most terrible cases of trench foot.

In 1915 came indeed a renaissance—a veritable revival of learning. There must be no division between the scientific principles of peace medicine and surgery and war medicine and surgery

**A renaissance—
scientific
free-thought**

—if the indications for abdominal wounds in peace were immediate operation, they could not be met by morphia-gorging in war. Many new problems were crying aloud for solution.

[Here Major McDonald briefly surveyed the chief scientific and clinical problems of the first two years of the war, in particular the problems of paratyphoid, trench fever, cerebro-spinal fever, nephritis and endemic jaundice, and wound pathology. The evolution of scientific research and the work of the mobile laboratories was examined. Some of these observations are embodied in other chapters. He continues as follows:]

With all these developments there was naturally a keen conflict between enterprise and authority. The younger men had mostly been trained to think and work with a certain regard for authority but a much greater regard for scientific truth and medical knowledge. Men who so protested were apt to be side-tracked. But with the advent of 1915-16 the situation changed—the ranks of the temporary officers were filled by more senior men, who in many cases were in responsible positions when the war broke out. Gradually the voice of authority was eased, and the mere fact that a suggestion came from a temporary officer was insufficient to damn it.

Major McDonald's comment on the administrative excellences of the R.A.M.C., the example afforded in some matters for the Australian Service, and the experiences of Australian officers with British medical units is contained in an appendix.¹⁸

THE EVOLUTION OF RESEARCH IN THE BRITISH ARMY 1914-18

The change from the "N.B.R." of 1914 to a vigorous and all-pervading spirit of scientific enterprise, with its system of military research laboratories and special clinical hospitals and the correlation of these with corresponding civil institutions "diverted" to the purpose of war—all this makes a story which in the interest of scientific progress calls for a special history. It can only be referred to here in briefest outline, so as to fit into the picture the developments in scientific medicine in the Australian military organisation. The story develops along the lines which we have traced from the beginnings of scientific medicine—namely, *clinical observation* and *laboratory analysis*, between which, as already mentioned, the liaison was, at the outbreak of war, imperfect. The history of scientific development in the war is broadly that of a progressive specialisation along both these lines, and their eventual merging in something at times approaching to pure research.

The difference between scientific "research" in peace and war is fundamental. In peace, though admirable research may proceed on purely utilitarian lines (*e.g.* in great industrial firms or Government Departments) and though it is increasingly looked to for "useful" results, yet the search for knowledge is often *pursued as an end in itself*, independently of what material advantage may be expected. The scientific researches of war, on the other hand—like those of science in Hitler's "new order"—are inexorably utilitarian and purposeful—the "usefulness" being strictly confined to the purpose in view, which is primarily, war.

In the British Army in the First World War research was organised in response to most acute needs. An excellent example of this will be found in *Volume I* of this work, in which the military episode of disease at Gallipoli is examined and the causes of that tragedy traced. At the root of this medical debacle

¹⁸ Appendix No. 3.

(for as was there stated "it was nothing less") is to be found *ignorance*; ignorance of the root causes and agents of disease regarded in the mass, and this in turn beginning in ignorance of the exact nature of *disease entities* that comprised the mass of this disablement. Whatever philosophy of disease may be the fashion in peace, in wars, pestilences, and famines the "causes" are specific, intelligible, and chiefly external. At Gallipoli the problem hinged on the nature of the typhoid-like infections which yet were resistant to the immunising effect of anti-typhoid inoculations, and of the "bloody fluxes" which, quite obviously, were mass-produced—but through what agency? "animal", "vegetable", or "mineral"?¹⁹ The medical service was unable to give an answer to this question, and when it did attempt one this was at first incorrect. "Intelligence" was in fact at first faulty; and the reason for the failure of the medical service to forestall the debacle, in so far at least as "intelligence" could achieve this, was failure of the War Office to make adequate provision, as a matter of military organisation, not merely for original research (which we may compare with the obtaining of "intelligence" to guide the Chief of the General Staff), but for routine information as to the nature and disposition of the "enemy" on the local front.

And for the Western theatre of war, as for the Eastern, it is not unfair to say of the organisation in the British Army for the application of scientific medicine to war problems that "it just grew".

The *British Official Medical History* says:

No central pathological organisation existed in peace nor had one been contemplated in war establishments. Like other branches of the Service, when the need came an organisation gradually evolved itself, more or less adequate for the needs that had to be met. Failing any pre-arranged system of sufficient elasticity to meet the complex needs of forces operating at a distance and under climatic conditions which varied from those at Archangel to those on the Equator, the War Office limited itself to the provision of personnel and equipment, leaving it to the medical directorate of the force in question to employ these to the best advantage. . . .²⁰

¹⁹ The issue lay between "mud in the water" (at first favoured) and hard diet, bacteria (vegetable), and the entamoeba (animal). See Vol. I. Chap. xvi.

²⁰ *British Official Medical History, Pathology*, p. 5.

And again—

No provision had been contemplated in the war establishments for the installation of central laboratories, to be devoted to research problems and freed from the burden of the routine duties falling on the pathologists attached to hospitals or mobile laboratories. In this, as in so many other directions, a lesson was learnt, and there is reason to hope that such laboratories will be provided in future establishments. It was always hoped, and indeed confidently anticipated, that the pathologists engaged in the various authorised bacteriological units would have opportunities from time to time to engage in enquiries connected with the needs of the sick and wounded and this proved to be the case. Some of the most valuable of the scientific advances in medical knowledge came from the individual labours of men working in mobile or hospital laboratories. However, the new medical and surgical problems which the progress of the war brought to notice demanded fundamental researches beyond the powers of individuals, whose first duty lay in meeting the daily needs of the physicians and surgeons of the area their laboratory served.²¹

But from the beginning of 1916 we find, at least in the stable conditions of the Western Front, a closely integrated system for "research" for knowledge and wisdom and for the dissemination of this among all concerned in implementing new discoveries in the quest of "victory".²²

This was far more true of laboratory (analytical) research than of clinical. But in clinical medicine and surgery, as in pathology and other lines of analytical investigation, it was found necessary to provide to an increasing degree for *specialisation* in research. This was effected by creating special clinical centres, with suitable specialist clinicians,—at the front, special casualty clearing stations, stationary hospitals, even field ambulances for special types of wound and disease—for example head and chest wounds, gassed cases, "N.Y.D.N.", N.Y.D. gas, S.I.W., and skin cases; at the expeditionary base—special hospitals, wards, or even centres and on similar lines; at the home base—the important system of special hospitals and clinics for orthopaedics and facio-maxillary wounds, for the trial of B.I.P.P., for "nervous", heart, renal and various infectious diseases—besides the hospitals of the Royal Flying Corps and Navy. It was in the Orthopaedic Hospitals in London and the provinces—at Shepherd's Bush, Roehampton, in Liverpool and elsewhere that orthopaedic surgery was re-created; at the

²¹ *Ibid*, p 16.

²² See Vol. II, Chap. ii.

Hospital for Diseases of the Heart at Colchester Thomas Lewis carried out his epoch-making investigations into the nature of "soldier's heart"; at the Maudsley, Seale Hayne, Maghull and other hospitals that Rows, Hurst, Mapother, Hadfield, Head, Rivers, and Ross created that psychic outlook on the aberrations that manifest themselves within the field of mental "awareness" which, keeping hold of the principle of the oneness of body and mind, provided the material for the War Office enquiry into "shell-shock". At all these institutions research was more or less effectively correlated with work at the seat of war; and it is the result of these tasks that constitutes the chief claim of the "Great War" to any approach to "greatness" as a constructive element in the progress of human culture.

The problem of providing for research, when the authorities ultimately came face to face with it, presented a formidable task.

Apart altogether from exploiting civil resources and extending those of the Army into such matters as food, aviation problems and chemical warfare,²³ the administrative authorities had to provide personnel and organisation for (a) routine investigations (b) research in pathology²⁴ including the advisory and executive agencies and those for disseminating information; and this had to be done in three spheres—the front, overseas base, and home base. The two former comprised the expeditionary seat of war—that is to say, on the Western Front, the administrative domain of the B.E.F.

The Front had its problems of the immediate treatment, and effects, of wounds, and the prevention and disposal of "acute" disease; at the *Expeditionary Base* the immediate complications and direct sequelae of both appeared and had repercussions both backward and forward; and at the *Home Base* the final results of wounds and of diseases were being found to be exactly related to the methods adopted for dealing with the original casualty at the front.

The organisation of the British Army is centrifugal;²⁵

²³ Reference is made to these in the chapters on aviation, chemical warfare, etc

²⁴ Pathology was always taken to include bacteriology and parasitology but not usually (as to-day it certainly would) bio-chemistry and bio-physics.

²⁵ Contrary to that of the Navy, which is centripetal. A naval witness at the Dardanelles Commission stated that this antithesis made it impossible for a combined military and naval operation to be continued over a long period.

local decisions were left to local authority to a degree that made the latter almost autonomous; except for its being dependent on home for *personnel* and supplies. This independence tended to create (and for two years did create) two administrative zones: (1) that of the *Field Armies* (Directors of Medical Service) and *Lines of Communication* and expeditionary bases (Director General of Lines of Communication), and (2) that controlled directly by the War Office in Great Britain. The system by which "consultants" and "specialist advisers" (surgical and medical) were distributed in the field has been described, as also has the medical organisation of the lines of communication in France.²⁶ The consultants and advisers were drawn partly from "specialists"²⁷ of the Army Medical Service but chiefly from the civil profession.

The pathological work of the laboratories may be indicated by the following short extracts from the *British Official Medical History*. "The laboratories," it says, **The R.A.M.C. laboratories** "were of three classes: (1) mobile bacteriological laboratories; (2) hospital laboratories; and (3) research laboratories." Of the first it says:²⁸

The history of the origin and development of these units is one of considerable interest and has been well described by Lieut.-Colonel A. C. H. Gray,²⁹ who himself had charge of one of the earliest which was sent to France. Their employment in close touch with the front-line forces had been contemplated as a practical proposition for an expeditionary force prior to the war, and in particular had been advocated in an able thesis by Colonel S. L. Cummins. Although none had been authorised or organised on mobilisation it was not many weeks before the need for such units was increasingly felt and a request for them was sent to the War Office. Colonel Cummins, who was at that time on the headquarters staff of the force, supplied in outline the kind of equipment which the situation called for, and prompt steps were taken to supply this need. With the helpful collaboration of Lieut.-Colonel C. J. Martin and his colleagues of the Lister Institute, a suitable motor was found, originally fitted as a motor caravan, and this was purchased, dismantled, and

²⁶ *Vol II, Chap ii, and Section II* It was omitted to note that Assistant Advisers in Pathology were attached to Armies. The duties of the Adviser in Pathology, B.E.F. are an indication of the part played by this specialty. More and more as the war progressed the problems of clinical medicine and clinical surgery involved the integration of clinical observation with laboratory analysis in a campaign of "research" and the Adviser in Pathology became as in civil life the one on whom it fell to design and initiate the nature and place of the campaign.

²⁷ See Maj. McDonald's note, p. 231

²⁸ *Pathology Volume*, pp. 9-10. See also *Vol. II*, p. 5 of the present work.

²⁹ *Journal of R.A.M.C.*, 1922, Vol. XXXVIII, p. 323.

equipped as a mobile laboratory in a short space of time. The Lister Institute also lent the services of one of the most competent of their staff in the person of Major S. R. Rowland, who, in addition to his high technical proficiency, had a good knowledge of motors. This officer was placed in charge of the new laboratory and took it over to France, where he was joined by Major A. Stokes, and where, as No. 1 Mobile Bacteriological Laboratory, it played a most prominent part in the early pathological history of the war. It was one of the particularly sad incidents of the campaign that Major Rowland did not live to reap the certain credit and probable rewards which should have fallen to him for his splendid work. He died in 1917 from cerebro-spinal meningitis contracted in the course of his duties. . . .

The work of the laboratory of a General Hospital is described later in dealing with the Australian units.³⁰

It has already been stated that no provision had been contemplated in the war establishments for *research laboratories*, nor indeed for any other form of research. Co-operation between the laboratory and the clinician in the B.E.F. was thus unduly delayed, with the result that the French were first in important lines of investigation such as the treatment of wounds. On the other hand the system as it actually grew in the B.E.F. was adapted to the needs. As Sir William Leishman, Adviser in Pathology, B.E.F., has said:³¹

Research work . . . was usually organised by the formation of an *ad hoc* committee of enquiry, who enlisted the services of pathologists specially qualified in the particular lines of research required and who held meetings from time to time to draw up programmes of research and make the necessary arrangements for their effective conduct. Instances of these were the enquiries carried out in France in connection with pyrexia of uncertain origin and trench fever, war nephritis, surgical shock and influenza.

We have already seen some of the results of this method in the investigation of wound infection, wound shock, tetanus, dysentery and typhoid, and shall presently have to fit into this organisation the most dramatic and instructive episode in medical research in the war, the episode of Trench Fever. But it is interesting here to note that the first research laboratory in France was established by a leader so well known in Australia as Colonel Sir Almroth Wright, who joined the B.E.F. technically as one of the first Consultant Physicians sent out

³⁰ See also Vol. II, pp. 412-13

³¹ *British Official Medical History, Pathology*, p. 17.

by the War Office.³² The *British Official Medical History* says:³³

Starting from very small beginnings in the buildings at Boulogne occupied by No. 13 General Hospital, he established by degrees what was essentially a research laboratory, devoted in the main to the study of the pathology and treatment of wounds. He was assisted for varying periods by a number of his former colleagues and assistants from his institute in St. Mary's Hospital, and from this centre emanated a large part of the new contributions to pathological knowledge on such subjects as wound pathology and bacteriology, and on the causation, prevention and treatment of gas gangrene.

The parallel between this development and that of the laboratory formed in No. 3 A.G.H. at Lemnos in 1915 is so close as to cause regret that the movement initiated in the Australian Service could not be followed up.

In Great Britain the purpose of research was twofold. In the first place it was necessary to organise a vast system for the supply of sera and vaccines for both diagnostic and therapeutic purposes. It is easier to imagine than describe the immensity of the organisation required to supply the demands of many millions of men in the matter of these complex biological products. There soon became obvious the need for established headquarters for the more elaborate and fundamental procedures in biological, physical, and chemical research.

In the second place the War Office had, as already pointed out, to create the establishment for its system of pathology in the overseas expeditions and to correlate it with the research institutions in Britain, besides providing for routine work in the several home "commands". The provision of biological materials was based on the Royal Army Medical College, which supplied chiefly vaccines and the Lister Institute of Preventive Medicine which was responsible for diagnostic and therapeutic sera; St. Mary's Hospital (Inoculation Department); and "sister institutions in London and elsewhere".³⁴ On these laboratories also was based individual research work. Much research was also carried out at war hospitals or in the laboratories of the universities and medical schools.

³² His influence on British medicine as Director of the research laboratories at St. Mary's Hospital, London, had its parallel in his influence on the outlook of medical teaching in the University of Sydney.

³³ *Pathology Volume*, p. 17

³⁴ See *British Official Medical History, Pathology*

The Medical Research Committee, set up in Great Britain as an integral part of the national insurance scheme was, from the beginning of the war, switched over to the services of the war. It will be seen later that Australian scientific work was more closely concerned in this than in any activity of research. The Australian Service will also be found in interesting contact with the Hunterian Museum of the Royal College of Surgeons and with its Director, Sir Arthur Keith.

The Medical Research Committee

The actual creation or discovery of new "knowledge" and wisdom is always highly individual, and may take long to diffuse even throughout such family groups as Divisions or Armies, research centres, or seats of war, let alone national units.³⁵ Among the first to recognise the need for machinery for dissemination were the Directors General of the Army Medical Service in France and at the War Office. We are here concerned with the diffusion not only of routine military instructions but of medical knowledge through a machinery created with the specific purpose of correlating discoveries and advances made in the various armies and commands and even units at the front,³⁶ the research laboratories, military and civil, at home, and the experiences of the Allied and even enemy powers.³⁷ Like most other wartime organization this was carried out very exactly; for while "nothing ever lasted long"³⁸ provision had to be made "as if the war were going to last for ever".³⁸

Agencies for dissemination

Among the most interesting agencies of dissemination were some individual efforts, for example the clinical research centres sometimes established at C.C.S.'s around the personality of an outstanding individual—for example that created at No. 3 British C.C.S. at Gezain-

Individual

³⁵ For the history of the diffusion of the principle of excision of wounds, see *Vol II, Chap. xii*.

³⁶ In the American Army the Red Cross Society played a most important part in organising research and disseminating its results. (See "Announcement" in *The Medical Bulletin*, No. 1, Nov, 1917, published for the A.E.F.)

³⁷ The latter was effected through the Medical Supplement to the *Monthly Summary of News from the Foreign Press* published by the War Office (See *British Official History, Pathology*, p. 19).

³⁸ This description was applied by the Acting Registrar, Maj. J. T. Tait, to the work of No. 1 A.G.H. in 1915.

court.³⁹ At other centres similar results were achieved as part of an organised scheme—e.g. the experimental work on wound infection at No. 10 C.C.S.⁴⁰

Of the many circumstances which militated against rapid advance in the surgery of wounds⁴¹ one of the most serious was the fact that, having operated on a man, the surgeon at the C.C.S. lost sight of the patient when evacuated to the Base as effectively as if he had died on the table.

The admirable arrangement whereby this local hiatus, and still wider ones, were met, are referred to by Sir William Leishman:⁴²

The liaison between the British Expeditionary Force and the Medical Research Committee was always very intimate, since the Adviser in Pathology to the forces in France was himself a member of the Committee, and this liaison was still further strengthened at a later date by the appointment of Lieut.-Colonel T. R. Elliott as the executive representative of the Medical Research Committee in France. Colonel Elliott, who later became consultant physician for the Boulogne Base, was instrumental in carrying through on behalf of the Committee a number of measures which proved of great value, not only to the cause of Pathology, but also to the general medical and surgical necessities of the force. For example, the organisation of a system by which it became possible for those who had treated cases in their early stages to ascertain particulars of the ultimate results was successfully carried into effect and filled a blank which could not apparently be provided for by any modifications in the existing official statistical machinery.

The diffusion resulting from the creation of a body of consultants and "advisers"—surgeons, physicians, pathologists and so forth, as already described—is self-evident. Another means that had definite value was the formation of local societies (for example the Anzac Medical Society and the Desert Mounted Corps Medical Society)⁴³ but they were commonly restricted in their scope. The proceedings of the "Military Section" of the Royal Society of Medicine have been quoted elsewhere.

Advisory and consultative committees were also created,

³⁹ See Vol. II, p. 662 Compare also Carrel's combined clinical and pathological experiments at Compiègne

⁴⁰ Vol. II, p. 332.

⁴¹ See Chap. xvi, Vol. II.

⁴² *British Official History, Pathology*, p. 18.

⁴³ See Vol. I, pp. 368 and 393 and 641n

either for special enquiries (*e.g.* into gas warfare, orthopaedic treatment, hospital management) or permanent committees, such as the Sanitary Advisory Committee, B.E.F.,⁴⁴ and the Army Sanitary Committee, Central Medical War Committee and the Medical Research Committee (National Insurance) in Great Britain.

Of the immense range of publications the most important probably were the official manuals, especially "Treatment of disease and injury in war", and the publications of the Medical Research Committee. Professional journals which devoted space to special war problems ranged from the *Journal of the Royal Army Medical Corps*, the *British Medical Journal*, *Lancet*, and specialist journals of Physiology, Pathology, Ophthalmology, etc., to the *Medical Review of the Foreign Press* published by the Medical Research Committee.

For the exchange of knowledge between the Allies a "Commission Sanitaire⁴⁵ Interalliée" was created and held Annual "Plenary Sessions". The Commission comprised (a) a Standing Committee ("permanent delegates") who with the assistance of the staff of the "Office International d'Hygiène Publique" kept touch throughout the year with developments in the medical problems, military and civil, of each of the Allied powers. The Secretary furnished a report on this at the annual conferences. The Standing Committee also drew up the programmes for discussion in the annual conferences. This permanent body merged after the war with the famous permanent technical organisations and commissions of the League of Nations.⁴⁶ (b) An annual conference, or "plenary session", of representatives from each of the Allied Powers⁴⁷ selected by the heads of the medical services and accredited by the Governments was held yearly. The Commission was domiciled with, and its staff was partly composed by that of the "Office

⁴⁴ See Vol. II, p. 508n

⁴⁵ The relevant translation is *not* "sanitary" in the British or even American sense (See Vol II, p. 735-6) the programme of the conferences show their subjects to comprise rather the "scientific" aspect of medicine or hygiene.

⁴⁶ Correspondence relating to the circumstances of the agreement by Australia to participate in this permanent organisation is in the Australian War Memorial.

⁴⁷ Canada, Australia, South Africa and New Zealand were each represented in the British delegation.

International d'Hygiène Publique" (International quarantine) in the Boulevard St. Germain, Paris.⁴⁸

Unfortunately no record of the first conference, which opened on 6th April 1916,⁴⁹ is available. For 1917, 1918 and 1919 the reports of the British Delegation, to **The Annual "Conferences"** which the Australian representative acted as an unofficial professional secretary, and the official *procès-verbal* are among the Australian records and furnish lists of the subjects for discussion.

1917 Conference (21 Feb.-17 March).

MEDICINE AND SURGERY.

1. *Infectious Jaundice in the Allied Armies*, and more especially all that regards ictero-haemorrhagic spirochaetosis, its distinctive features, its aetiology, contagiousness, and prophylaxy.

2. *Commotional syndrome and mental troubles in Armies in the Field: Clinical studies and organisation of hospitals at the front or in the rest of the country.* This question includes a study of mental troubles, of general paralysis, of hysteric and neuropathic symptoms, with or without lesions.

3. *New or apparently new affections (also exotic affections) observed in the course of the war.* Among the first, a special study will be made of trench fever, trench nephritis, and gastro-enteritis (bacteriology). Exotic diseases are all those which may have been imported by Colonial drafts. Typhus and relapsing fever might be added.

4. *Bacillary and amoebian dysentery.* Relative frequency of bacillary and amoebic types. Search for germ carriers, either among convalescent or healthy people. Results of treatment by serum and by emetine.

5. *Advisability of revaccinations* (anti-typhoid and anti-choleraic). Time and conditions suitable for these. Statistical information.

6. *Veneral diseases.*

7. *Measures taken in different countries concerning tuberculous soldiers.*

8. *General organisation of surgical services in the war area, chiefly with a view to the avoidance of infectious complications of wounds* (gaseous gangrene, septicaemia, etc.).

9. (a) *Prevention and treatment of tetanus—late tetanus.* Various manners of administering serum, doses, repeated injections.

(b) Prophylactic measures against malaria adopted by the Allies during the present war.

(c) Prophylactic measures in connection with diphtheria carriers.

⁴⁸ The permanent President of the Conferences was the Italian delegate M. le Professor Santoliquido. The Secretary to the Department of International Quarantine, M. le Médecin Aide-Major Geley, also acted as Secretary to the Commission (Conference).

⁴⁹ The Australian Imperial Force was at the time being transferred to Europe from the Eastern Theatre, but was represented at the Conference.

GENERAL HYGIENE.

10. *Arrangements made for ensuring continuous sanitation of billets, camps, and trenches, in spite of the perpetual shifting of the units which occupy them.*

11. *Laundry and disinfecting arrangements in Armies.*

12. *Feeding and rations of troops.* Arrangements for carrying warm food to the trenches.

13. *Improvements in the methods for purifying drinking water.* Hypochlorite, ozone, etc.

14. *Inspection of preserved food factories working for the Army.*

15. *General hygiene during the progress of evacuation.* This has nothing to do with the full organisation of services for the evacuation of patients; only the way in which details could be improved will be considered; for instance, questions of faeces in ambulance trains might be discussed.

16. *Arrangements for burying the dead.*

NAVY.

17. *Life-saving devices in use in transport and other ships when torpedoed.*

1918 Conference (12-22 March).

1. *Rational feeding of the armies in the field.*

2. *Morbid manifestations of an anomalous, abnormal, or indeterminate character.* Facts with regard to new pathological entities, spirochaetosis (except syphilis), jaundice, trench fever, nephritis, scurvy.

3. *Progress in general prophylactic measures,* more especially in prophylaxis by vaccination or inoculations.

4. *Measures against malaria.*

5. *Measures against formidable infections (plague, cholera, typhus), and against pneumonia.*

6. *Facts with regard to typhoid affections in the armies (typhoid, paratyphoid and similar typhoid and paratyphoid affections); aetiology, diagnosis, vaccination, sero-therapeutics.*

7. *Epidemics of diarrhoea in the armies in the field, their bacterial agents; problems of amoebiasis.*

8. *Cerebro-spinal meningitis.* Specifications of the different types of meningococci and their corresponding sera.

9. *Present position of anti-syphilitic measures.* New treatment of gonorrhoea.

10. *Tuberculosis and pseudo-tuberculosis in the armies.*

11. *Short survey of progress in surgery as related to the war; organisation of the health service at the front.* Measures against septicaemia, tetanus, and gas gangrene.

Plan of Comparative Study.

12. *Comparative experimental study in the methods employed in the purification of drinking water in the armies.* Treatment by eau de Javel, chlorinated lime, chloramine, chlorine gas, ozone, etc.

13. *Comparative study of progress in hygiene in billets and camps, measures against rats, flies, mosquitoes.* Cleanliness in person and clothing.

14. *Comparative experimental studies of measures taken to destroy skin parasites in man and beast.*

1919 Conference (20-31 March).

1. *Influenza: Aetiology, Prophylaxis, Complications.*
2. *Epidemic Encephalitis Lethargica.*
3. *Spirochaetoses.*
4. *Present stage of prophylaxis of Bilharziasis.*
5. *Dangers of the formation of indigenous centres of Malaria.*
6. *Typhus, Smallpox, Dysentery, Cholera: Recent information on Aetiology and Prophylaxis.*
7. *Results and future of the campaign against Venereal Diseases and Tuberculosis.*
8. *Discussion of the study by the permanent Delegation of the Purification of Water and the Hygiene of Armies.*
9. *New contributions to the Problem of Scientific Alimentation.*
10. *Sanitary and Prophylactic Problems of Demobilisation.*

After the conference held in May, 1918, the Australian delegate noted:

The discussions and conclusions arrived at by these Conferences appear to me to be influencing the policy of the Allied Powers in the prevention of disease in their Armies, more each year. . . .

The representation of Australia in these Conferences is, in my opinion, of no small national importance. Australia, in common with the other Dominions, has no part in deciding the principles and policy which should govern the prevention of disease in the Armies in the Field. . . . Attendances at the Conferences gives me, as responsible for the collection of material for the Australian Scientific History of the War, an opportunity for obtaining first hand knowledge of the principles and methods of arriving at them on which to some extent have been based the British procedure in connection with the prevention of disease. It must however be recognised that discussions at the Conferences did not, as far as I can gather, actually *govern* the policy of those responsible for the Sanitary administration of the British Armies in France. It is to be noted that the General Headquarters in France were entirely responsible and independent of the War Office . . . the "Sanitary" policy of the Armies in France is absolutely controlled by the D.G.M.S., B.E.F., under advice of the Sanitary Committee . . .

It may be noted that the French Government insist that the proceedings of the Conference be treated with the utmost secrecy. In consequence, in 1917, the proceedings were known to none but those in authority in the respective nations. No Field Units or Administration had access to the report. I am, in common with other British delegates, endeavouring to arrange that the data from the reports be made available immediately for action by sanitary administrations, and not only through the medium of the Orders issued from G.H.Q. by circular memoranda or otherwise.

Whether necessary in military interests or not the extreme secrecy insisted upon by the French Government

militated against the value of the conference as an educative agency.

A HIGHLIGHT OF COMBINED RESEARCH—TRENCH FEVER

It would be impossible in this chapter even to summarise the investigations carried out by the R.A.M.C. during the war. The most that can be done is to illustrate them by reference to a research of outstanding interest. We have chosen this highlight partly because it relates to the chief aetiological type into which in this history we group the diseases and disabilities with which the service had to deal, and partly because it represents constructive results of wartime effort; and these—withstanding much said and written to the contrary—the present investigator has found to be, on the whole, both rare and meagre.

The subject matter of the special research which is chosen as a highlight comes from Type III—diseases due to infective agents (the type which we have indicated as the main basis for the countermeasures comprised in "Prevention of Disease").⁵⁰ From this type we select the Typhus Group, and from that group the "new" disease of the war—the so called "Five-day" "Volhynian", or, as it was commonly known to the Allies, Trench Fever. This is selected also because its discovery illustrates what has already been cited in these pages as the *outstanding* development brought about in medical practice by the war—the welding of clinical observation with analytical (laboratory) investigation.

The Typhus Group comprises, besides a large number of diseases (*e.g.* Rocky Mountain Fever and the Australian endemic form, which do not concern us) two infections both louse-borne but each fairly specific, which were of first-rate influence in the war. These were epidemic typhus and "trench fever". The former was only seen in France as an accidental stowaway brought chiefly from Egypt.⁵¹ The latter was on the Western Front one of the most important causes of wastage.⁵²

Identification. The disease was not identified in the Gal-

⁵⁰ See Vol. II, p. 535 *et seq.* ⁵¹ See Vol. II, pp. 543-4. Vol II, pp. 579-80.

⁵² The disease it would seem disappeared after the war as mysteriously as it arose.

lipoli Campaign but as it was prevalent on the Macedonian front it was possibly missed at Gallipoli in the welter of "P.U.O.", paratyphoid, "rheumatic fever" and "influenza". In the summer of 1915, on the Western Front, medical officers came to recognise among the various undiagnosed pyrexial conditions which were being returned as "Pyrexia of Unknown Origin", a clinical "syndrome" which occurred with sufficient consistency and frequency to justify its discrimination as a specific "disease". The first published account is that by Major J. H. P. Graham, R.A.M.C. (S.R.), who in September 1915 described in the *Lancet*⁵³ "A Relapsing Febrile Illness of unknown origin", in which two periods of pyrexia were separated by a normal interval.

In the latter part of the same year Captain G. H. Hunt and Major A. C. Rankin described thirty cases of the same kind; and in February of 1916 two distinct clinical types of what appeared to be an identical condition, but one showing intermittent and the other continuous pyrexia, were identified and described by McNee, Renshaw and Brunt.⁵⁴ In the meantime, in January 1916, cases of the second type of the disease (that with continuous pyrexia) had been identified by Lieut.-Colonel Arthur Hurst⁵⁵ in Salonica, his attention having been drawn to their existence by officers of No. 1 New Zealand Stationary Hospital.⁵⁶ Cases of the first type soon appeared; and "as medical officers became more familiar with its characteristics it became clear that it was extremely common, especially in certain units".⁵⁷

Within a few months of these initial observations, the syndrome became recognised as widely distributed among the belligerents, especially on the Western Front. According to Colonel Sir Wilmot Herringham, Senior Consultant Physician, B.E.F., "literally thousands of cases of the first type occurred among the troops in France and Flanders between the end of April and October, 1915" (Hurst). In the first "full session" of

⁵³ *Lancet*, Vol. II, 1915, p. 703 (25 Sept., 1915.)

⁵⁴ *Brit. Med Jour* 12 Feb 1916, Vol. I, p. 225 Capt J. W. McNee, Lieut. A. Renshaw, Capt. E. H. Brunt.

⁵⁵ *Medical Disease of the War* by Arthur F. Hurst, M.A., M.D. (Oxon.) F.R.C.P., p. 72-3 (London Edward Arnold, 1917)

⁵⁶ Lieut.-Col. D. J. McGavin, Maj. D. S. Wylie and Maj. H. T. D. Acland.

⁵⁷ Hurst, *loc. cit* p. 73.

the Interallied Sanitary Conference (May 1916), Colonel Sir W. B. Leishman, Adviser in Pathology, B.E.F., gave a full account of the discovery and clinical features of the "new disease".⁵⁸ Reports soon appeared in the medical press of several nations, recording under various names—La Fièvre des Tranchées (French), Volhynian Fever (German), "Gaiter-pain" Fever (Austrian), "Five-day" Fever (periodic form, German) and sundry others⁵⁹—observations from almost every front of fevers of short duration and uncertain aetiology. The various accounts gradually conformed to a more or less defined, but still vague clinical entity.⁶⁰

Definition. The clinical "Aunt Sally" thus set up by the British physicians, did not lack the proper attention, and not least from its creators, the more so as P.U.O. had become a military problem of formidable proportions. The clinical syndrome was promptly discerned as furnishing suggestive analogy to a host of recognised febrile diseases. It was necessary to discriminate the syndrome not only from various specific fevers recurring or of short duration—dengue, "three-day" (phlebotomus) fever, malaria, "Polish" fever, "Russian intermittent fever" and so forth—but (a more difficult diagnosis) from aberrant types of major disease, such as typhoid modified by inoculation, paratyphoid, "influenza" and (most interesting and suggestive) a modified form of typhus fever. Discrimination as an authentic "disease" from this veritable maze of aetiological alternatives became a matter of both clinical and laboratory concern—with the British maintaining their lead. Before passing to the second phase of the campaign (laboratory research and experiment) it is desirable to identify briefly the symptomatology of the condition, and to give some figures showing its extraordinary epidemic potentialities as a cause of wastage.

⁵⁸ Unfortunately, the Australian records of the war do not include the report of this session. It would appear from the records of the next session (1917) that the communication caused a scientific "sensation"

⁵⁹ As noted later many early designations confused it with other diseases. The term "trench fever" was first used by Hunt and Rankin (*Lancet*, 20 Nov., 1915)

⁶⁰ Thus, in his résumé for the year 1916 under *Morbidité dans les Armées ennemies* the permanent Secretary to the Interallied Sanitary Commission (M Geley) in February, 1917, reported under "La Fièvre des Tranchées"

"Cette si intéressante pyrexie, découverte et magistralement étudiée par le Service de Santé de l'Armée britannique, a été observée, par les médecins allemands et autrichiens, sur le front occidental et sur le front oriental"

"Les observations rapportées par eux en sont très nombreuses à partir du printemps de 1916. Les premières de ces observations, telles que celles du Dr. Gratzner, qui datent de mai 1916, sont assez peu précises. . ." It is added that later observations were more exact.

The outstanding features of the disease have been stated as follows:⁶¹

(a) It is practically never fatal⁶² (b) It is however extremely depressing, resembling in this the virus diseases, as influenza and dengue.

**Clinical
features and
course**

(c) It is an acute febrile disease with sudden onset. Its symptoms, physical signs and course may conform to a few accepted types but are often bizarre and misleading. When it assumes certain forms it is quite characteristic; when it assumes others it can only be diagnosed by taking all its positive features into consideration and by ruling out other diseases. (d) *Characteristic symptoms*, physical signs and course are stated to be—prodromal symptoms, headache, malaise, weakness: acute onset commonly with chill; malaise varying from lassitude to severe and sudden weakness with dizziness and even fainting; extreme anorexia and nausea; characteristic pain both in the onset and in later stages—headache, lumbar, calf, thigh, and shin pains; occasional abdominal pains.

Physical signs: coated tongue, tenderness in any region of the body; a typical rash; enlarged spleen; characteristic pyrexia.

Course: characteristically "short" (4 or 5 days with a remission followed by subsequent pyrexia of same duration); "long" (continuous fever resembling paratyphoid); single bout resembling influenza.

Late Relapses: A striking feature of trench fever is its tendency to relapse—up to many months.

(e) Sequelae and complications of a depressive mental type are not uncommon.

Prevalence: It is impossible to give with any accuracy the rate of incidence among the troops. The fever was not notifiable till 1918. A report by Colonel Soltau states that of 26,000 cases admitted to a group of casualty clearing stations in 1917, 17,350 were of trench fever.

The importance of the disease may be gathered from the following estimates. The average evacuation for sickness to the Base in France was 0.6 per cent. of weekly strength. During 1917 the percentage figure for this disease would be about 0.09 per cent.; that is an Army of 1,000,000 would lose in a year at least 45,000 casualties from trench fever. Of these casualties 80 per cent. would lose on an average at least 3 months off duty.

The problem was tackled in the front-line technical unit, the Mobile Bacteriological Laboratory. It is not possible or necessary to traverse in detail this first phase of the scientific analysis of trench fever. In the B.E.F. it is associated chiefly with the names of McNee, Renshaw and Brunt. Following the order of enquiry and methods which were by now the routine

⁶¹ In a summary by the Australian Collator. The Report published by the American Red Cross (pp. 306-10) and the *British Official History*, Vol. I., *Diseases of the War*, p. 359, are quoted.

⁶² As a cause of wastage through "non-battle casualty" it has a curious analogy to "gas" as a "battle casualty".

procedures in clinical diagnosis—urinalysis, blood counts, microscopic and cultural investigations, serum reactions, and so forth—the hypothesis of a “new disease” was gradually confirmed by exclusion. Positive phenomena, which should determine the exact pathogeny and relations of the condition and suggest its aetiological determinants were however conspicuously absent.

Nor did animal experiment prove helpful. The “dead reckoning” of scientific analogy pointed strongly in the direction of an insect-borne disease of the typhus type and to the louse as the vector. The military authorities not less than scientific medicine required positive proof. By the end of 1915 it had become apparent to McNee and his co-workers that the problem could only be solved by a complete and exact campaign of human experiment of the kind that had solved the terrific problem of yellow fever.⁶³ But the Army authorities in France refused facilities for an organised campaign. Thus barred, the R.A.M.C., with the full support of Sir William Leishman, did what they could, carrying out among themselves a series of experiments to determine (1) the infectivity of the disease, (2) the medium, immediate and remote, of its convection from man to man. The results of these are epitomised from the *British Official Medical History (Pathology, p. 495-6)* which is in accord with other authorities.

Infectivity of the blood. Since animal experiments had proved a failure, and the disease was obviously not dangerous to life, McNee, Renshaw and Brunt resolved in the Summer of 1915 to attempt to transmit the disease to man. At first the pooled serum from several acute cases was used, but without result. Finally it became possible to carry out an inoculation with “whole blood”, taken from the vein of a patient directly into a syringe which had been washed out with a solution of sodium citrate and injected forthwith into

⁶³ Practitioners of to-day who were students of medicine in the 'nineties especially those who were students at Guy's hospital London, will recall the dramatic *dénouement* of Ross's discovery of the life-history of Laveran's malarial organism in the anopheline mosquito when Patrick Manson's son, then a student at Guy's, was bitten by mosquitoes which had been fed on malarial patients in Italy and sent to London by sea and within the prescribed period developed a sharp attack of the appropriate type of malaria.

the vein of a volunteer. This experiment was completely successful, the volunteer passing through a severe and typical attack of the fever. Seven experiments in all were performed, and all of them were successful, whether the intravenous or subcutaneous methods of inoculation were employed.

After proving the infectivity of the blood, McNee, Renshaw and Brunt continued their investigation on the question of what part of the blood contained the virus. These experiments could only be carried out on a very small scale, since the work was in no way aided officially, and volunteers had to be sought for under very restricted conditions by the workers themselves. As the result of these experiments, the following conclusions were arrived at—

- (1) The disease is transmissible in every case by the whole blood, whether injected intravenously or intramuscularly.
- (2) The disease is not transmissible by the serum.
- (3) The virus is not a "filter-passer" in the serum, as from analogy was thought might be the case.
- (4) The infectivity of the plasma or otherwise remained uncertain but the results seem to point to the virus being contained within the blood corpuscles themselves.

Here, perforce, the research was left—the enquiry had reached a bag's end. "These experiments," the British historian states, "carried out in 1915, remained quite uncontrolled and unconfirmed until the American Commission took up the same problems in January 1918."

During the months of July and August 1917 the American Expeditionary Force began to arrive in France, and its medical staff to study the special problems of the Western Front.⁶⁴

After several months' study (writes Major R. P. Strong, M.R.C.)⁶⁵ of the problems relating to the prevention of infectious diseases occurring in the Allied Armies on the Western Front, it became evident to the writer that the subject of the method of transmission of trench fever was one of the most important for investigation in connection with the loss of man-power already occurring in some of these armies, and likely to increase in other armies. . . . A further investigation of the prevalence

⁶⁴ The Sanitary Inspector, Second Army, A.E.F. was the celebrated writer and scientist, Maj. Hans Zinsser, the author of *Rats, Lice and History*; and incidentally of an admirable memorandum on the problem of the prevention of disease on the Western Front, now in the Australian War Memorial.

⁶⁵ *Trench Fever*, Report of Commission, Medical Research Committee, American Red Cross, Oxford University Press, 1918, pp. 1-2.

of trench fever⁶⁶ only emphasised the importance of attempting to discover . . . the method of transmission of the disease. . . . As no adequate or extensive investigations had been undertaken on the subject of the transmission of trench fever during the three years that it had prevailed, we felt it important to offer to carry on this work.

The situation in the B.E.F. was made known to American officers by the committee appointed by the D.G.M.S., B.E.F. (Lieut.-General Sloggett) to examine into the fevers of unknown origin; in particular they explained "the difficulty of securing the necessary volunteers for such studies" "Our desire," Major Strong states, "was not to take up any investigation on trench fever which they wished to carry on." Arrangements were accordingly made that the American Medical Service should undertake the human experiments in a British hospital and with the collaboration of Captain McNee and the assistance, as entomologist, of Captain A. D. Peacock, R.A.M.C. (T.). The research was carried out under the auspices, and with the financial assistance of the "Medical Research Committee of the American Red Cross".⁶⁷

But the proverbial crystal had been thrown into the super-saturated solution. The scientific advisers of the B.E.F. were able now to make clear even to the military authorities and to the Government the consequences of a policy of "back to Methuselah".

**The "cat begins
to kill the rat"**

A concerted campaign was undertaken—in the B.E.F. and by a special research committee organised by the War Office which established laboratories in the Medical Research Committee's hospital at Hampstead, and was given authority to obtain civilian volunteers for human experiment.

The two campaigns were carried out in a spirit of mutual co-operation, combined with a wholesome tang of competition—the ideal atmosphere for scientific creation. The British Service had achieved, through America, the opportunity hitherto denied it—and went ahead at high pressure. The American team was established in a British Stationary Hospital near the front—"so as to experiment with the disease during the first and

⁶⁶ In this it was found that "the most common diseases [in the evacuation from the front] are scabies, infections of the skin, and pyrexia of unknown origin, of which trench fever constitutes the great majority of cases".

⁶⁷ The position of the "Red Cross" in the American Army differed very greatly from that in the British. It undertook *e.g.* assistance of a kind which in the British Army was held wholly outside its province. The consequences of this, and developments therefrom fundamentally affect the future of Voluntary Aid.

second days of illness, as well as in its later stages". It received—and cordially acknowledged—the fullest co-operation and help from the Army Medical Service of the B.E.F. It also got going at "high pressure" but with a technique which left no loopholes for error.

The purpose of this note does not require that we follow the course of the respective investigations. The

The dénouement: results are stated by Sir David Bruce as
a dead-heat follows:⁶⁸

To the War Office Trench Fever Committee then is due the honour of having been the first to demonstrate by experiment the part played by the louse in the transmission of trench fever. The first experiments on the transmission of the disease by the bites alone were started on 29th December, 1917, and were negative. The experiments with excreta were begun on 5th February 1918 and the first successful result was obtained on the 14th February. As the question of the priority of the discovery depends on the date of its publication I may say that this was published on 23rd March 1918, as an interim report in the *British Medical Journal*. The American Research Committee in France however ran the War Office Committee very closely. . . . The investigation of trench fever was started by them about the end of January, 1918. . . . On 14th February, 1918, the . . . Committee stated that experiments on louse-transmission were still in progress but no positive results had been obtained. On 9th March they reported that in 21 experiments in which louse-transmission was attempted 4 so far have proved positive. The Committee then passed a resolution that, after an examination of these cases, they felt that they had sufficient evidence to say that it had been shown that trench fever is transmitted by the louse.

The conclusions reached by these investigations are well summarised in the admirable account given in the *British Official Medical History* and are given in a footnote.⁶⁹ The

⁶⁸ *Trench Fever*, W. Byam (Oxford Medical Publications, Oxford University Press, 1919). p. xiii

⁶⁹ "The extent of existing knowledge of the pathology of trench fever can be summarised as follows—

- (1) The exact nature of the infecting virus is as yet uncertain.
- (2) The means of transmission of the disease in nature is the body-louse.
- (3) The blood of a trench fever patient may contain the virus for many months, even in the absence of all pyrexia
- (4) In the louse, the presence of the infection is closely bound up with the appearance of so-called Rickettsia bodies in the intestinal canal of the insect.
- (5) There is an incubation period of about five days in the louse, after feeding on a trench fever patient, before the excreta became infective.
- (6) Once infected, the louse remains in this condition until its death, but the virus is not transmitted by the ova.
- (7) The virus of trench fever remains virulent in dried louse excreta for a long time, there is experimental proof up to one hundred and twenty days.
- (8) The virus is destroyed by 2 per cent. lysol or cresol, and by a temperature of 70°C., moist heat, in twenty minutes.
- (9) The prophylaxis of the disease essentially depends on the destruction of lice, and on effective disinfection of all clothing."

admirable reports made by Leishman and Strong to the Inter-allied Sanitary Conference are printed in the proceedings.⁷⁰

It must be acknowledged that the claim of priority made by Sir David Bruce leaves something to be desired in the matter of good taste. It is obvious that with **Credit, where due?** the resources for publication at his hand—as they were not for the Americans—an interim report was a ready means to obtain credit, which (as is obvious) should have been shared equally by both America and Britain. The British scientific workers were kept back for two years from consummating their researches, and thus deserve to have succeeded; on the other hand the Americans brought the modern outlook and determination without which such a research was impossible. To whom then should credit be given? Most readers will answer, “To both”; and that, so far as this history is concerned, is the verdict on this fine achievement.

RESEARCH IN THE AUSTRALIAN ARMY MEDICAL SERVICE 1914-18

Into the background, thus barely indicated, of the provision for research in the British Army and of one typical highlight from the mass of the results, there **Limits of research in the A.I.F.** must now be fitted certain highlights of Australian achievement to furnish an illustration (for space permits nothing more) of the modicum of wartime research and pioneering carried out in the A.I.F.

For from the outset it must be stated that, much as in the British Army research was at first restricted by the conservative outlook of the R.A.M.C. “die-hards”, so in the A.I.F. limits were set to it by three main conditions—first, that no more than the British was the Australian peace-time army medical establishment alive to the need for it; second, that from start to finish the force was devised and organised not as an expeditionary force in the full sense but as a front-line contingent in the British Expeditionary Forces; third, that by the “six months’ policy”⁷¹ convalescents not likely to be fit for front-line duty within that time were, in almost all cases, returned to Australia.

⁷⁰ *Australian War Memorial records*

⁷¹ *See Vol I, pp 506-7, 656-7*

It will be remembered that in 1914, when the raising of the A.I.F. began, a request by the then D.G.M.S. in Australia, General Williams, that certain medical lines of communication units⁷² should be included was rejected by the Military Board in Melbourne;⁷³ the ground given was that it would be an "impertinence", in view of the fact that the Australian force was taking part in the war not as an "expedition" but as a subsidiary, if an independent, "force". The War Office, in asking on 21st August 1914 for the lines of communication units for a division, did not require a mobile laboratory; and though the Canadian Government on its own initiative provided one,⁷⁴ the Australian did not.

At the outbreak of the war Major Tebbutt, pathologist to the Royal Prince Alfred Hospital Sydney, and a keen militia officer, saw the Principal Medical Officer for that District, Colonel T. Fiaschi, and urged on him the importance of bacteriology in army medical service.⁷⁵ Colonel Fiaschi was one of the most erudite surgeons in Australia, but he was steeped in Army tradition, as was the militia service in general. He saw no value in the suggestion, nor did General Williams to whom Dr. Tebbutt was referred. If the suggestion was of value, they held, it concerned the British Army and not the A.I.F. Dr. Tebbutt accordingly volunteered for duty as an R.M.O.

The influence of Surgeon-General Williams upon the policy of the A.A.M.C. and A.I.F. was quickly surpassed by that of his eventual successor, Surgeon-General Howse, whose actual power in the military force of his nation was probably unapproached by that of any other medical officer in the First World War. But with all his great qualities of character and intellect, Surgeon-General Howse did not, as a part of his professional make-up, fully appreciate the significance of "scientific" research. Fully alive through his Gallipoli experi-

⁷² An advanced depot of medical stores, a sanitary section, and a convalescent depot. *See Vol. I, p. 28n.*

⁷³ It was on the "Expeditionary" character of the force that he based his request to be made its D.M.S.

⁷⁴ It became "No. 5 Mobile Laboratory B.E.F."; under the command of Maj. G. G. Nasmith—not a medical man, but of exceptional force of character—it made a name for itself on the Western Front.

⁷⁵ "The military mind did not seem to . . . see that, now when this holocaust had fallen on the world, it would be used for the future welfare of man . . . Not even Sisyphus had a more difficult task before him than my husband had to convince the authorities of the great importance of bacteriological and pathological work in the war" (*Number 4 Canadian Hospital The Letters of Professor J. J. Mackenzie from the Salonika Front Toronto, 1933*).

ence to the practical importance of "preventive medicine" in the field,⁷⁶ he was yet incapable of appreciating from his own experience the value of research as applied to the medical problems of this war. Moreover he would have considered it outside his duty to concern himself with it, since he accepted fully and deliberately the limited position of the Australian Imperial Force and loyally and with the highest insight and commanding ability fitted the medical service into the place which he believed to be appointed for it. When specifically called on to do so he found both men and facilities for "research"; but with him it was always a side-issue, wholly subordinate to questions of administration and policy bearing directly on the problem of maintaining the strength and fighting efficiency of the A.I.F.

Yet as these pages will amply show, and as all who knew him intimately are agreed, his attitude was very far removed from that of "N.B.R." For example the formation at Anzac by his initiative of the Anzac Medical Society, a venture unique in the history of medical societies, was no mere "gesture"—to keep men from going stale when they were "bored stiff" with the almost intolerable sordidness and professional sterility of Gallipoli—but was a genuine effort to advance and disseminate knowledge that could be obtained in that extraordinary episode.⁷⁷ Regular meetings were held on the Peninsula, and were continued in Egypt after the evacuation. A clue to his outlook lies in the fact that the subject submitted by him for discussion at the first meeting was "The Louse" and that the officer selected to open the discussion was an R.M.O.

In the following summary of some of the main lines of scientific observation or research undertaken by the A.A.M.S. Australian operations in the Eastern theatre of war, and in the Pacific are to a great extent excluded, having been the subject of independent studies in *Volume I*.⁷⁸ Nor is further reference made to the investigation undertaken during the Gallipoli Campaign by No. 3 A.G.H. at Lemnos into the

⁷⁶ He was one of the first to urge that the Sanitary Section should be a Divisional, not an L. of C., unit. A sketch of his work and character is given in *Vol. II*, pp. 803-7, and of his attitude to "science", *Vol. II*, p. 836.

⁷⁷ A brief account of the Society is given in *Vol. I*, pp. 363, 398.

⁷⁸ *Vol. I, Part II*—Light Horse and Palestine by Downes and *Part III* New Guinea by Maguire and Cilento.

nature of the gastro-intestinal diseases which had resulted in one of the most serious medical debacles in British military history, which is fully described in the same volume.⁷⁹ As was there stated—

There is no more interesting chapter in the history of the A.A.M.C., nor any more fraught with instruction and scientific inspiration, than that afforded by these four strenuous months of co-operation between the physicians and pathologists in which these two departments of medicine—so often unhappily sundered—were united in ideal collaboration.

From that fine episode there came besides its important direct results, two indirect ones of great value—first the standard of clinical breadth of view and integrity which, as we shall see, was impressed on the medical department of Australian pensioning through the influence on the Advisory Committee of Sir Richard Stawell; second the impress on the analytical medical work of the A.I.F. of the personality of that great scientist, Sir Charles Martin.⁸⁰

A major development came when, after the Gallipoli Campaign, in the first months of 1916 the Australian Imperial Force was reconstituted. As part of this **Reorganisation after Gallipoli** change Colonel Howse, then D.D.M.S. of the Anzac Corps, secured the establishment of a Medical Department whose Director was responsible—so far as interior economy went—only to the Australian Command and Government. He himself was appointed Director, and the positions created on his staff included “consultant” specialists in medicine and in surgery, and an “Adviser in Pathology”. The two clinical appointments were filled by Colonel (later Sir) Henry Maudsley and Colonel (later Sir) Charles Ryan respectively;⁸¹ the pathological appointment was filled by Major A. H. Tebbutt.

It cannot be said that the appointment of the two consultants had any (striking) influence on the outlook of medical

⁷⁹ *Pp* 454-466.

⁸⁰ All the other leading participants in this combined adventure in research attained to positions of importance in Australian medicine. On the clinical side Colonel Champion de Crespigny is now Dean of the Faculty of Medicine, University of Adelaide and an acknowledged leader in Australian clinical medicine.

Upjohn is accepted as one of Australia's most scientific surgeons. Sister Williams, after this training at Lemnos, collaborated with Col. Martin in important intra-war studies in dysentery on the Western Front and has since been (and happily still is) a member of the staff of the Walter and Eliza Hall Institute for Research in Melbourne.

⁸¹ See Vol. I. *pp.* 478n.

administration in the A.I.F. At least during 1916 and 1917 the practical problems were far too urgent to permit of the deliberate development of a "scientific" side in the war-activities of the Australian Medical Service. The clinical consultants became wholly immersed in the work of the Reviewing Medical Board on invalids.⁸² With the pathological appointment, however, it was otherwise. Major Tebbutt, since his vain effort at the outbreak of war to have provision made in the A.I.F. for pathological work, had served in Gallipoli as R.M.O. and later as D.A.D.M.S. of the Anzac Corps, and had opportunity not only to verify the need but to use the dramatic events of disease at Anzac to convince Colonel Howse (then D.D.M.S. of Corps) of the practical military utility of such provision.

On 23rd January 1916, as Adviser he submitted a comprehensive proposal for the General Hospitals⁸³ based on the expectation that they would be located within one general command. He first pointed out that Nos. 1 and 2 Stationary Hospitals had no laboratories—work was to be done for them by a mobile laboratory in the Suez Canal zone. Nos. 1 and 2 General each had a laboratory, and an officer detailed for pathological work but also charged with some clinical duties.

(1) Neither laboratory (he said) is adequately fitted up for ordinary bacteriological diagnosis, and some apparatus has already become unserviceable. From the outset the more difficult work—such as Wassermann tests and special bacteriological diagnoses—has been done by fixed laboratories in Cairo, and the tendency seems to have been, owing to change of staff and unserviceability of apparatus, for more and more work to be deputed to the fixed laboratories, with resulting inefficiency of the hospital laboratories and lack of interest and confidence in their work by the Medical and Surgical staff of these hospitals.

The No. 3 General Hospital has a very well equipped laboratory under Major Martin, and is capable of doing all its ordinary pathological work, but this Officer would probably prefer to have the few Wassermann's that he is asked to do, done in a laboratory where many are put through.

The hospital for venereal diseases has purchased an equipment in England which is, I am informed, very complete for its own special diagnoses. The Pathologist (Captain Wylie) has had some training, and has had an opportunity of seeing such work done whilst in London. I see no reason why this laboratory cannot do the venereal diagnosis for all the Australian Hospitals in Cairo instead of sending such specimens to the Hygienic Institute.

⁸² See *Chap. xiii and Appendix No. 4*

⁸³ The idea of a mobile laboratory was apparently also submitted but was rejected.

The No. 4 Auxiliary Convalescent Depot has a room set apart as a laboratory, but has practically no equipment as yet.

(2) The causes of the inefficiency as explained above, in Nos. 1 and 2 General Hospitals, are in my opinion:

- (a) Lack of special training in the Officers detailed for this work.
- (b) Lack of "understudies" both to Officer and laboratory attendant who would be ready to take up the work if the latter should become casualties.
- (c) Inadequacy and unserviceability of laboratory outfits.
- (d) The part-time character of the Officers' work.

Colonel Tebbutt went on to say that the need could be met either by centralisation—establishing in Cairo a laboratory with equipment preferably composed of several complete sets, which could be detached with the hospitals if they were moved beyond range of the central laboratory. The central laboratory would serve as a training ground for officers and would carry out all the more difficult tasks, routine examinations and simple work being done in the hospital laboratories. The other method, which he recommended, was decentralisation—the strengthening of the existing laboratory staffs in the hospitals by appointment of full-time pathologists for each with part-time assistant pathologists in training to take their places if necessary, the system of always having an understudy in readiness being applied also to the trained laboratory attendants. The apparatus should be brought up to date by purchase in Egypt or Australia. The pathologists should use their spare time in visiting better laboratories, improving their technique and extending the scope of their work.⁸⁴ Howse's notes on these recommendations show that he decided to implement at once the system of decentralisation recommended, and steps were forthwith taken to select men and secure equipment.

Early in March No. 3 A.G.H. returned to Egypt from Lemnos, and with it Lieut.-Colonel Martin as its Pathologist.⁸⁵

A memorable episode: Tebbutt and Martin

The position was delicate. Colonel Martin was a Fellow of the Royal Society, a scientist of world reputation, the Director of one of the great research institutes of the British Empire and of the world and late Director and Professor of Physiology

⁸⁴ The report was signed by Col. Tebbutt as "Senior Bacteriologist".

⁸⁵ Maj. Upjohn had been invalided.

in Australian Universities. Lieut.-Colonel Tebbutt has recorded the *dénouement*:⁸⁶

I at once went to see Martin and discussed the situation with him. He said he was quite willing to work under me, but he must draw the line at saluting! I agreed! We went ahead—nosed round Cairo for equipment; discussed arrangements and secured personnel. Colonel Martin threw himself entirely into the job and gave me the greatest help. I soon saw, of course, that Martin was clearly the man for the position and though it was a disappointment to leave my special work I decided to ask to be relieved of it. Colonel Howse agreed and gave me command of No. 14 Field Ambulance.⁸⁷

Of the episode Colonel Martin has said:⁸⁸

"It was a fine and magnanimous act on Tebbutt's part." The members of the service will agree.

On his appointment Colonel Martin completed the organisation of a Pathological Department, and arranged that the officers appointed should receive special instruction.⁸⁹

Colonel Tebbutt's scheme, modified to suit the new circumstances of separation of Infantry and Light Horse was implemented in that pathologists with promising assistants were appointed to each of the three General Hospitals, and their laboratories were equipped for a very full field of routine investigation and even for minor research. Nos. 1 and 2 General went to France; the D.M.S. and his staff to England. No. 3 A.G.H. remained, as will be recalled to clear up after Gallipoli, and to serve the Light Horse; the subsequent history of pathology and research in this hospital is followed in later pages.

⁸⁶ In a personal communication.

⁸⁷ Col. Tebbutt's record in the field in this command was a distinguished one. A memorandum by him on trench foot in the winter of 1916-17 was a notable contribution to the problem.

After the war he resumed his specialty and is to-day one of the leading pathologists of Australia.

⁸⁸ Memorandum to the Collator Australian Medical History.

⁸⁹ Howse's authority to him (dated 24 March 1916) was as follows:

To Senior Bacteriologist,
A.A.M.C.

In reply to your letter of the 20th March '16.

(1) Your proposal that the pathologists at the Hospitals of the A.I.F. be sent in rotation for four days to No. 19 General Hospital, Alexandria, for instruction by Colonel Wenyon (consulting protozoologist to the Forces in Egypt) in the detection and identification of protozoal and intestinal parasites is approved, and you are instructed to arrange with the O.C.'s of the different Hospitals and with Colonel Wenyon as to suitable times for their visits and for carrying on of the pathological work during their absence from their Unit.

(2) With regard to your suggestion that further medical men of pathological experience be encouraged to join the A.A.M.C. the D.M.S. would be glad to hear of any pathologists in Australia whom you could recommend for Commissions.

Lieut.-Colonel Martin did not accompany the D.M.S. to England, but remained as Pathologist with No. 3 A.G.H. in Cairo, and soon was caught up in the dramatic and urgent problems that arose when the Australian Light Horsemen and British Infantry made contact with the varied carrier content of the Turkish Army. A small outbreak of *Cholera asiatica* occurred among the troops in the Sinai desert, and disaster threatened if this disease crossed the Canal and spread to the crowded population of Egypt. On the last occasion on which it had reached there, in 1896, over 100,000 deaths were caused.

On August 7th, Colonel Martin was sent to the affected area. With Major Ferguson, an officer of the British Service commanding the Military Bacteriological Laboratory at Alexandria, he decided to carry out investigations locally, and to form "diarrhoea camps" and a temporary field laboratory in connection with each camp. These measures were taken to prevent the disease from crossing the Canal, and they met with unqualified success. The report on the work of this Australian unit has been epitomised as follows:

The main laboratory was primarily designed as a cholera diagnosis station, but was also fully equipped to deal with any work required on the front. To obtain quick diagnosis and avoid the sending to the Base of men who were suffering only diarrhoea, the laboratory was established as far forward as possible, its first station being at Kilo 47 on the Kantara Railway, near Katia.⁹⁰ The main cholera camp and a group of ambulances were situated here.

Work was commenced in an E.P. tent, but subsequently a large, double Glasgow hut was used and sterilisation, media making and cleaning were conducted in the E.P. hut.

A motor laboratory was impracticable in country of that nature. As the equipment could be packed and ready for transport in eight hours the unit was as mobile as a field ambulance. Although this laboratory was established temporarily to combat cholera, the utility of such a unit became so patent that it was retained permanently as the Desert Mounted Corps Mobile Laboratory, organised and manned by Australians—the only pathological field unit maintained by Australia in the war.

On account of the large area for which this laboratory had to cater in Palestine, it was divided in July, 1917; half the staff being established nearer Railhead. The advanced section was then housed in a small Glasgow hut, and a move could be effected in three hours. Media, etc. were prepared in the rear section, which thus became more or less

⁹⁰ The staff originally consisted of Lt.-Col. C. J. Martin, Capt. D. J. Glissan, S.-Sgt. G. G. Grant, A.A.M.C., Cpl R. A. Newton, A.A.M.C. and Pte. A. E. Taylor.

immobile, the division being thus somewhat similar to that of a field ambulance.

In its first year's operations this laboratory traversed about 230 kilometres and investigations were carried out in nine localities.⁹¹ It was usually attached to a field ambulance or C.C.S. Rapid diagnoses were essential as patients had to be evacuated to the Base, and it was thus necessary, at times, to curtail a certain amount of work. The following table is a summary of the first year's work (exclusive of water analyses) and gives the number of investigations and ascertained positive diagnoses. In many investigations, of course, the result could not be expressed in terms of "positive" and "negative".

Nature of Examination.	Number		Ascert'd positive	
	British	Native	British	Native
1. Faeces for Cholera, Dysentery, etc.	3,548	280	1,131	225
2. Urines for Bilharzia Haematobia	275	—	71	—
3. Throat Swabs for Diphtheria	5,835	4	250	—
4. Blood films for Malaria, Relapsing Fever, etc. . .	619	1,579	120	711
5. Blood cultures for Enterica, etc.	34	—	6	—
6. Cerebro-Spinal fluid for Meningococcus	4	—	4	—
7. Urethral Smears for Gonococcus	29	21	8	11
8. Gas Gangrene (anaerobes)	4	—	2	—
9. Oriental sore (Leishman Donovan)	3	—	3	—
10. Sputum for T.B. . . .	58	2	3	—
11. Septic Sores, etc. Preparation of vaccines . . .	54	—	—	—
12. Urine (general and bacteriological)	90	—	—	—
13. Miscellaneous examinations	47	—	—	—
	10,600	1,886	1,598	947
Grand total	12,486		2,545	

Cholera. As the epidemic had practically subsided before the laboratory was established only two positive cases were diagnosed, and in no instance was a carrier detected.

Amoebic and Bacillary Dysentery. Faeces were examined microscopically for the presence or absence of amoebae or protozoa. Of the total number of specimens examined (3,828), 1,374 contained blood and mucus and 661 definite positives were obtained—the latter figure including

⁹¹ Kantara Railway, near Katia; Bir El Abd; El Arish; Rafa; Belah; Beni Selah, Shellal; Fukhar; Sheikh Zowaid.

In some respects the nature of the work differed materially from that of the first year. Thus the examinations required for cholera had fortunately been few and insignificant in number, while on the other hand the extreme development of malaria in the Jordan Valley had required an unprecedented amount of blood work, thus entailing the examination of thousands of blood films and constant application to microscopic work. Added to the tedium of this were the discomforts of the hot, muggy valley with its daily dust storms.

For the further period of six months of the laboratory's operations the work consisted chiefly of the examination of blood slides for malaria, of which the malignant type now predominated over the benign. In November, 1918, the laboratory was moved from the Jordan Valley and stationed near Richon le Zion. In December it went to Aleppo where, although the examination of blood films still constituted more than half its task, much work was also done in examining urines, throat swabs, sputum, etc., and on behalf of the Veterinary Services.

The laboratory was fortunate in its staff. Lieut.-Colonel Martin was in charge until October, 1916, and Captain Rosewarne from March to September, 1917, when Lieutenant G. G. Grant (who had been with it from its foundation) took charge. He was evacuated with malignant malaria in August, 1918, and died at Gaza on August 31st. His energy and ability had contributed greatly to its success. A further loss was suffered in the death of Staff-Sergeant C. F. Sullivan in November, 1918. Major E. W. Ferguson took command on 21st August, 1918, and was in charge until the disbandment of the unit on 31st January 1919.⁹²

The work of two and a half years from August, 1916 to January, 1919, may be briefly summarised as follows:⁹³

Dysenteric examinations	.. .. .	5,454
Other examinations	.. .. .	25,950
Veterinary examinations	.. .. .	407
Water, etc.	.. .. .	528
		<hr/>
		33,339

And as spread over the three periods:

August 1916, to August 1917	.. .. .	12,486 examinations
August 1917, to August 1918	.. .. .	9,177 examinations
August 1918, to 31st January 1919	.. .. .	10,308 examinations

For other highlights of scientific work in the domain of preventive medicine in this theatre of war we can here refer only by mention to the campaign against malaria in the Jordan Valley, and to the "sanitary" improvisations car-

⁹² Two members of the original staff, S-Sgt. Newton and L-Cpl. Taylor, served with it from first to last.

⁹³ See also Vol. I. p. 751n.

only amoebic and "typical" pathogenic dysentery bacilli. The following were the results:

Entamoeba Histolytica ..	209, or 5.1 per cent of total specimens
Flexner Y type	148 " 3.8 " " " "
Shiga-Krause	304 " 7.9 " " " "

The proportion of positives to the number of specimens which contained blood and mucus was—Amoebic 15.2 per cent, Flexner 10.7 per cent, and Shiga 22.1 per cent. It is shown by these figures that bacillary dysentery was more than twice as frequent as amoebic.

In the second year of its work the laboratory was split into two sections, immobile and mobile. In August 1917 these were stationed at El Fukhari and Shellal, and during the year the mobile section moved to Ramleh, Khirbet Deiran and the Jordan Valley. Examination of faeces for dysentery organisms still claimed a good deal of attention, but blood work for the diagnosis of malaria became of paramount importance, especially when the laboratory was stationed in the Jordan Valley. The following is a brief summary of this year's work:

Nature of Examination.	Number.		Ascert'd positive	
	British.	Native.	British	Native.
I. Total examinations of Diarrhoea cases	885	435		
Cases containing blood, mucus, or both			352	227
Positive diagnoses made			377	196
II. Throat swabs examined ..	942	2		
Diphtheria			47	
Blood slides examined ..	4,752	1,374		
Malaria:				
Benign Tertian			682	168
Malignant Tertian ..			392	206
Quartan			2	
Benign and Mal.			24	16
Relapsing Fever			7	42
Urethral smears	120	11		
Gonococci			48	3
Urines for Bilharzia ..	33	6	13	4
Other urine examinations	145	7	3	1
Sputum for T.B.	52	2	5	
Miscellaneous examinations	64	13	9	4
III. Examination of surgical dressings, etc. ..	26	—		
Examination of (soil) Anthrax			1	
IV. Veterinary examinations	105		16	
V. Examinations of water ..	157			
Examinations of Vaccines	46			
Grand total	7,327	1,850	1,978	867

ried out by No. 7 (Anzac) Sanitary Section (Major Harvey Sutton).⁹⁴

In the Eastern theatre of war the exigencies of the "six months' policy" did not press as severely as they did in England; and the circumstances of the Australian Light Horse there favoured the development of a "national" outlook. These factors gave opportunity for the emergence of the scientific possibilities inherent in Australian medicine as evolved and impressed during half a century on some ten generations of students in the nation's medical schools. The conditions of the work at No. 14 A.G.H. at Port Said have been described by Colonel Downes in the section of *Volume I* devoted to the Light Horse. This hospital was self-contained and "Australian" to a degree unapproached in any other. The patients were almost entirely Australian, the Staff entirely so. Working in a unison reminiscent of Lemnos the department of internal medicine under Colonel Charles Bickerton Blackburn,⁹⁵ that of clinical surgery under Colonel Athelstan Saw,⁹⁶ and the pathological department under Hamilton Fairley,⁹⁷ with the cordial co-operation of R.A.M.C. officers—as H. R. Dew⁹⁸—created a scientific atmosphere unsurpassed in the A.A.M.C.

The results of this appeared not only in a high standard of routine work, some valuable papers in medical journals, and some original work of a high quality, but in the creation of a reputation for scientific originality which gained for Australian graduates opportunities that were to lead to Fellowships of the Royal Society of London and some of the highest positions in the world of British scientific medicine.

It has to be recalled that the investigations undertaken were very strictly contained within the conditions and routine requirements of a military hospital. Yet out of these came important studies such as those by Dew and Fairley on The Dysenteric Infections (*Medical Journal of Australia*, 4th June 1921);

**Studies in
pathology and
pathogenesis**

⁹⁴ Both of these are described in *Vol. I*.

⁹⁵ Now Sir Charles Blackburn, first President of the Royal Australasian College of Physicians.

⁹⁶ Subsequently Sir Athelstan Saw, M.L.C. (W.A.).

⁹⁷ Col. N. H. Fairley, A.A.M.C., now Director special research Hospital for Tropical Diseases, London, etc. Medical Consultant, and A.I.F.

⁹⁸ H. R. Dew, R.A.M.C., now Professor of Surgery, University of Sydney.

by Fairley and Bahr on Bilharziasis and N. H. Fairley on the diagnosis of Typhus.⁹⁹

The history of Bilharziasis in the A.I.F. is so important that it calls for particular note. The epidemiology of this most amazing of diseases as experienced in the A.I.F.

Bilharziasis

has been given sufficient notice for the modern reader in the pages (and index) of *Volume I*. It may be recalled that the sexual stage of the life history of the trematode worm in the veins of the human bladder was discovered by Theodor Bilharz in 1852. Thereafter its distribution was found to be wide; Australian soldiers were infected in the Boer War and created endemic centres in Australia. The "scientific" history dates from the year 1904 when the life history of a *Schistosoma japonicum* was worked out by Japanese scientists. In 1915-16 Lieut.-Colonel R. T. Leiper discovered the intermediate host in certain water snails common in the sweet-water canals. During the war the disease was a commonplace of military experiences and a source of particular interest to Australian clinicians. It is at this point that we pick up the Australian thread of the story in the discovery of the rectal form of Bilharziasis by a medical officer (Captain F. Blois Lawton) working at No. 3 A.G.H. in 1916. This clinical episode is expounded as follows in a lecture by Captain Philip Manson-Bahr:¹⁰⁰

After stating his opinion—

I would like to see the clinician much more often in the laboratory and see the pathologist in the wards, both acting in a consultative capacity, and I would like to see it established as a rule that a pathological diagnosis which does not agree with the clinical signs should be regarded every bit as unsatisfactorily as a clinical diagnosis which does not tally with the pathological report. . . .

⁹⁹ From his studies at No. 14 A.G.H. Maj. Fairley drew the idea of exploiting the "Bordet-Gengou" method of "complement fixation" (which before the war was exploited by Wassermann in his lucky but momentous chancing upon the test for syphilis which bears his name) to determine whether invasion by the *Schistosoma haematobium* ("bilharzia") and the echinococcus ("hydatid disease") might lead to the production of "antibodies" capable of detection by this "reaction". This had "positive results"—and led to useful additions to our knowledge of these diseases. (See *Proc. 11th Session Australasian Medical Congress, 1920, p. 227*, "Immunity response in Helminthic Infestations", paper by N. H. Fairley.)

¹⁰⁰ Later Sir P. Manson-Bahr, C.M.G., D.S.O.; Director, Clinical Division, London School of Hygiene and Tropical Medicine Editor, 7th to 11th Editions of *Manson's Tropical Diseases*. He was Manson's son-in-law. The passage here quoted is from a lecture No. 3 published in the *Journal of the R.A.M.C.*, May 1918. A note by Lieut.-Col. Martin (anent the work at No. 3 A.G.H. at Lemnos) says: "I found Captain Bahr (lecturer tropical medicine London School of Tropical Medicine) doing nothing in a medicos' camp ('The lost dog's home') Mudros North. Bahr was with us three months, and gave most valuable service." (See *Vol. I, pp. 458n and 459n*.)

Captain Bahr, dealing with the diagnosis of certain tropical conditions, said:

An eosinophilia of over five per cent without a leucocytosis in this country is almost diagnostic of some helminthic infection such as the ascaris or the ankylostome or the urinary bilharzia. But a high eosinophilia of twenty to thirty per cent. or over, together with a total leucocytosis of 10,000 to 15,000 white cells, in a patient with anaemia, emaciation, enlarged liver, tenderness over the gall-bladder and often urticaria as well, should lead the pathologist to search long and on several occasions with a low-powered lense for the ova of the rectal bilharzia. There is no doubt that these cases . . . suggest at first sight enterica. Rectal bilharzia (*B. mansoni*) then, which is occurring among the troops in Egypt, produces a systemic disease identical in its clinical features with "Katayama disease" due to the allied *Schistosomum Japonicum* in Japan. This is an entirely new clinical fact, and credit of the discovery belongs to the staff of the Third Australian General Hospital. On the other hand the urinary bilharzia appears to produce no such marked systemic disturbance and only a slight eosinophilia.

Mention will be made later of Australian participation in the movement in the British Army Medical Service to create a collection of pathological specimens on the Hunterian model, to be housed in the Hunterian Museum, Royal College of Surgeons, as a national record available for studying and teaching of the scientific medical activities of the war. The Australian collection from the Eastern theatre was used in 1919 to form with the British "exhibits" the basis for a medical display and meeting in Cairo under the auspices of the Director of Medical Services of the Egyptian Expeditionary Force.

Those readers who have followed the history of the Australian Army Medical Service in the Western theatre during 1916-17 will not be surprised that scientifically the service to a great extent marked time during this period. The stupendous struggle in which the Australian infantry was involved, with an intensity certainly unsurpassed by any other national force,¹ drew into itself every resource and all the energies of which the Service and its Director were capable. The laboratories at the three Australian General and two Auxiliary Hospitals were fully occupied in routine work, and in the

¹ The proportion of "killed in action" and "died of wounds" to total strength was much higher in the Australian force than in any other in the British Empire.

absence of a special adviser on the immediate staff of Surgeon-General Howse initiative perforce was lacking. A world-wide epidemiological "accident"²—the diffusion, or independent development of cerebro-spinal fever—however, brought a new chapter in the history of laboratory research in the A.I.F.

This pandemic has already been referred to in other contexts; but wholly by chance it was discovered that a large proportion of the staff of Australian Administrative Headquarters were "carriers" of the diplococcus of Weichselbaum (as then it was known), causal agent of C.S.F. Colonel Martin, then engaged in the anti-cholera campaign, was asked to return. The request coincided with the development of important problems at the Lister Institute, and at the end of 1916, he came back to England. From this time dates the initiation of a "forward" policy in the laboratory work of the A.I.F.'s medical service which, however, was still limited by the circumstance that Surgeon-General Fetherston, D.G.M.S. in Australia, was not asked to enlist men especially for research and that General Howse's allocation of officers and other ranks to such work always depended on "whether the man could be spared" from what he accepted as the tasks proper to the A.I.F.

After dealing with the immediate problem—a brief account of which is given later in this chapter, Colonel Martin as Adviser in Pathology recommended a readjustment of the organisation of the pathological service of the A.I.F. to meet the conditions of the force in the Western theatre. His proposals envisaged a very complete system for both routine and research.³

(1) He re-introduced the idea of a Central (research) Laboratory for the A.I.F.—now to be stationed in England—and (2) he reorganised the pathological service of the General Hospitals in France; also (3) when, early in 1917, No. 3 A.G.H. was installed in a specially designed hospital site at Abbeville, he secured approval for its including a laboratory for research designed by himself. The "A.I.F. Central Laboratory" Colonel Martin located, by arrangement with Gen-

The extraordinary episode of C.S.F.

Narrative of events

A Central Laboratory for A.I.F. in England

² "Accident—event without apparent cause", (C.O.D.).

³ Contained in a memorandum to the D.M.S., A.I.F., Surg.-Gen. Howse.

erals Keogh and Howse, at the Lister Institute, which charged only a nominal rent for the unrivalled provision, facilities and conditions of work; Martin also secured authority for the A.I.F. Laboratory to function as the Central Laboratory for the "London Command". The laboratory was placed under Major Eustace Ferguson from No. 1 A.A.H. (Harefield) who had previously worked in Egypt under Colonel Wenyon, R.A.M.C. Its main work concerned one of the two spheres in which control of this outbreak of C.S.F.⁴ was urgent—that is among the Australians on leave in London and at the Command Depots, the other sphere being that of the sea transport of troops both outward and inward. This second part of the problem is dealt with in the chapter on sea transport later in this volume. Of the work concerning the depots and headquarters Major Ferguson reports:

In December, 1916, I did a special course of study at the London District Cerebrospinal Meningitis Laboratory under the supervision of Lieut.-Colonel M. Gordon⁵ and Captain Martin Flack. The Laboratory

⁴ It may be recalled that the disease was first exactly identified clinically in 1805 in Europe and in 1806 in America. Since that time, usually known as "spotted fever" it was a feature of the endemic disease picture of both continents, breaking out from time to time in epidemics having a curious focal form—its status as an "epidemic" being justified through its high case mortality rather than by the extent of the obvious morbidity. During the early years of the 19th century it was often confused with typhus fever in which disease its chief epidemic impetus from overcrowding is also potent. Between 1840-50 a very severe epidemic appeared in France, most severe in the barrack towns, and spread chiefly by troop movements.

In the American Civil War the Army of the Potomac was severely hit. An epidemic in the 'eighties gave Anton Weichselbaum the opportunity and Pasteur and Koch the methods for identifying a specific cause for the disease in the "diplococcus" named after him. During the 'nineties and in the decade before the war epidemic outbreaks occurred both in America and Europe. In this recrudescence the disease appeared seriously in Great Britain, where previously it had been confined chiefly to a few large towns, Glasgow in particular. During this last phase its epidemic incidence included Australia, where it had certainly been endemic since the 'nineties.

Thenceforward, with intermissions in its virulence and incidence but with constantly extending territorial occupation, the disease spread through Europe and America, and thence to Asia and Africa, and came to assume its present well-known epidemic and endemic form.

In the First World War as a cause of death in the Army, cerebro-spinal fever ranks with pneumonia and influenza. The "meningococcus" of Weichselbaum has indeed a bad "war record". Seldom in evidence in the trenches or at the front, and then inconspicuously, in barracks, in camps of training, on transports, and at the Expeditionary Bases, it came second to no other parasite as a disturber of the peace. Its penchant for a military environment is a remarkable phenomenon.

The curious pandemic and pan-endemic character assumed by the disease in its spread through the world seems to depend on an unusually equal balance of the two factors that are held to account for the biological phenomenon of epidemicity: a susceptible community and increased virulence in the organism; the importance of the latter being enhanced by the *vis a tergo* developed with each additional contact, carrier, or case, and itself reacting to produce a vicious circle.

Not the least important result of the discovery of the therapeutic potentialities of the sulphonamide group of chemicals is the reduction in the case mortality of this disease from 40-70 per cent. (as in the Australian experience) to a matter of 4-5 per cent, and, *pari passu* the relegation of the disease to a comparatively minor place in military medical problems.

⁵ It will be recalled that during the war Col. Gordon devised the system of "typing" the various strains of meningococcus. He is the author of the article on Cerebro-Spinal Fever in the *British Official History*. (*Vol. Pathology*).

included the methods which had been found most suitable and adapted for the isolation of the meningococcus, and for its identification by agglutination.

In January, 1917, arrangements were made for a special Australian laboratory staff to deal with C.S.M. carriers among the staff at A.I.F. Headquarters. Laboratory accommodation was secured at the Lister Institute and was on the same footing as the other research laboratories working in the same building and we were enabled to use permanent laboratory fittings. The special media required for the isolation of the coccus (*Trypar*) as well as the anti-sera of the four type-strains were obtained from the Central C.S.M. Laboratory. A licence was obtained from the Home Office for the use of laboratory animals and these were obtained when necessary from, and housed at, the Institute.

The staff of the laboratory consisted of myself, with Sister Williams as chief assistant and Sergeant Dawes. Other N.C.O.'s were attached for instruction.

The work chiefly concerned detection and isolation of carriers in the staff at A.I.F. Headquarters, a full report of which was submitted to the D.M.S., A.I.F.

It was thought that the laboratory would be able to carry out general pathological work for Nos. 2 and 3 Australian Auxiliaries, but this was not feasible, and a small diagnostic laboratory was established at each of these units.

The work done was part and parcel with the general scheme of research on this disease under Colonel Gordon and is not of sufficient distinction to justify a special description. The figures involved were considerable and the laboratory gained the confidence of all concerned. It was closed down at the end of May 1917. Major Ferguson was appointed bacteriologist to No. 3 A.G.H. at Abbeville; and subsequently to command the Anzac Field Laboratory, a position which he retained till the end of the war.⁶

The laboratory at No. 3 A.G.H. at Abbeville,⁷ was designed by Colonel Martin himself (with the approval both of General Howse and of the Adviser in Pathology to the B.E.F., Sir W. B. Leishman) for research as well as for routine. Just as he had finished this work at Abbeville he was seconded from the A.I.F., at Sir William Leishman's special request, to become Assistant Adviser in Pathology to the B.E.F. and direct the research and routine pathological work of the hospitals in the

⁶ Dr. Eustace Ferguson died in 1927 at the age of 42 years. At the time he was filling the position of Principal Microbiologist, Dept. of Public Health, N.S.W. His character and scientific attainments have gained for him an honourable place in Australian medical history.

⁷ See Vol. II, p. 400 (Plan of No. 3 A.G.H.).

Paris, Rouen, Trouville area. Working at No. 25 British Stationary Hospital (next to No. 1 A.G.H.) he remained constantly in touch with the activities of the Australian hospitals. The important researches into the complex problems of the aetiology of dysentery carried out by him with the co-operation of Captain Hartley, (R.A.M.C.) of the Lister Institute, Dr. Marjory Little, R.A.M.C., Pathology Department of Sydney University, and Sister F. E. Williams (A.A.N.S.) are epitomised in a footnote.⁸

The laboratories in Nos. 1 and 2 A.G.H. units were recognised and adequately equipped, and the influence of the Adviser in Pathology ensured some degree of continuity in their staffing. In No. 2 the pathologist, Major Inglis,⁹ in the intervals of emergency routine and important work on dysentery under the inspiration of that constant friend of the A.A.M.C., Colonel T. R. Elliott¹⁰ began the collection of museum specimens which, as presently to be described, he was later to carry to fruition.

On the special reorganisation of the laboratory at No. 3 A.G.H. by Colonel Martin and the disbandment of the A.I.F.

Central Laboratory in London Major Eustace Ferguson was put in charge. It was not however completed and equipped for *Research* till the middle of 1918 when it was selected for the important investigations into the matter of the causal

⁸ C. J. Martin and his co-workers (1) showed that "the chances of recovering dysentery bacilli from the stools decreases with extreme rapidity" (a) after subsidence of acute symptoms (b) after the passage of the stool. (2) Made important observations on the serological diagnosis of dysentery and especially distinction between the Shiga and other groups. See *British Medical Journal*, 20 April and 18 June, 1918.

Other important work on dysentery is that carried out by Capt. Shearman, a member of the Health Department of Western Australia, who, in default of opportunity for special work in the A.A.M.C. enlisted in the R.A.M.C. With Capt. J. Graham Willmore, in 1915 at Alexandria this officer made important observations on the cytological content, and character, of amoebic and bacillary stools (*Lancet*, 17 Aug 1918, p. 200). Their work was confirmed by Penfold—subsequently the first Director of the Australian Commonwealth Serum Laboratory—and Ledingham (*British Medical Journal*, 1915, Vol. II, p. 704). Other original observations on the diagnosis of dysentery are recorded in an article by Dr. Marjory Little in the *Medical Journal of Australia*, 6 January 1923, p. 1, which is illustrated by photographs of specimens from the Australian war collection; and by Sidney S. Rosebery ("Dysentery: A practical survey of One Thousand cases in a General Hospital in Egypt, 1918-19", *Ibid.*, 1 April 1933) The history of the disease is well summarised and documented in this last article.

⁹ Now Professor of Pathology in the University of Sydney.

¹⁰ Col. T. R. Elliott, C.B.E., D.S.O., F.R.S., Professor of Medicine, London University. Consulting Physician, British Armies in France, 1914-19.

With Sir Walter Morley Fletcher (another good friend to the A.A.M.S.) this great man did much to make British war medicine a field of science and research.

agent of influenza, an account of which is given in *Chapter IV*. Enquiries into the bacteriology of diarrhoea, nephritis, wound infections, and the possibility of infection being carried by bullets may also be mentioned.¹¹

The war, which found aviation little more than a new form of sport, accelerated its development and left it a highly developed science and art, well on the way toward the achievement of a new victory for man over his environment. But, as

¹¹ It must most strongly be emphasised that though the scientific work of the service has—chiefly by the restriction of medical practice and commissioned rank to graduates in medicine—to be told in terms of “medical” officers, the work of the laboratories could not have gone on without the highly skilled, enthusiastic, and in the fullest sense of the word “devoted” work of laboratory assistants. This fact is constantly emphasised by every officer who has written of his experiences in this work. Not a few of these technical experts found positions of responsibility in the same line after the war.

Of routine work the following is an example taken—almost at random—from the reports of the Pathologist of No. 3 A.G.H. at Abbeville.—

September 1917. During the month of September, a total of 337 specimens were submitted for examination, this being an increase of over 100 on that of August.

As before, urines, faeces and sputa comprise the bulk of the specimens submitted. The routine examination of specimens of faeces submitted involved the most work as, except in a few cases, each specimen was systematically examined for protozoa, ova and pathogenic bacilli.

The following worms were thus detected—*Ankylostoma*, 7 cases; *Trichuris trichiura*, 11 cases; *Ascaris lumbricoides*, 2 cases; *Taenia saginata*, 1 case. Of these the most important is *Ankylostoma*, whose presence in 7 out of 8 British West Indies men tested is an indication of the high degree of infestation among these troops.

A detailed list of the examinations made is appended.

(Sgd.) Eustace W. Ferguson, Captain, A.A.M.C.

<i>Faeces</i>	60	Ova of <i>Ankylostoma</i> detected in 7 out of 8 B.W.I. men examined. <i>Trichuris</i> Ova detected 2 times; <i>Taenia Saginata</i> , once. <i>B. Dysenteriae</i> Flexner isolated 3 times. <i>Entamoeba Histolytica</i> cysts seen once. <i>E. Coli</i> cysts 2 times.
<i>Urines</i>	97	Mostly for casts and blood in Nephritic cases. <i>Bilharzia</i> Ova seen once.
<i>Sputa</i>	52	T.B. positive, 8 cases.
<i>Throat Swabs</i> . .	16	K.L. positive, 2 cases.
Blood—		
Counts	30	Mainly leucocyte counts.
Films for Malaria	24	Two cases of Benign Tertian detected.
Cultures	6	All negative.
Agglutinations (Enterica) . .	8	
Wassermann . .	4	Sent to Etaples.
<i>Vaccines</i>	17	Mainly <i>Staphylococcus aureus</i> .
<i>Smears from Wounds</i>	8	These smears were taken to determine relative number of bacteria present before closing the wound.
<i>Urethral Discharges</i>	4	Gonococci detected 4 times.
<i>Sections</i>	1	Gland from neck.
<i>Miscellaneous</i> . .	10	Examinations of smears, rashes for sarcoptes, mycelium, etc.
Total	337	

with all the gifts of war, the price required in return was a terrible one. Pilots were trained, at the cost of a life for every 1,000 hours of flying. From an early date the problem of selecting men suitable for training was a difficult one and became increasingly so with the increase of speed and height. Each new type of machine brought new problems—physical, physiological and psychical—so that there could be but little “let up” in this death rate. The fact that the mass selection of flying men was essentially a medical problem, and that flying itself depended on factors with which the medical service was concerned, was neglected by the authorities; but early in 1916 it was recognised that both in the selection of pilots and in the physiological problem of flying the help of the medical profession was necessary. By the end of 1916 the problem of anoxaemia was becoming a pressing one. The problems involved, physiological, psychological, and mechanical,¹² make a history of the highest interest, and in meeting the needs British physiologists played an outstanding part. By the end of 1918 the physiological, psychological and physical problems of oxygen supply were well on the way to their final solution.

These two major problems—the *selection of recruits* and the *physiological effects of speed and altitude* came before the D.M.S., A.I.F., General Howse, when the Australian squadrons reached France. The action taken by him has been summarised as follows:

Early in 1918 the D.M.S., A.I.F., selected Major Kellaway¹³ to undergo a short period of training in the examination of R.A.A.F. recruits for flying officers and thereafter appointed him specialist member of a Medical Board comprising a physician, Major Edgar Stephen and an ear, nose and throat specialist, Major Brown, whose duty it was to assess the fitness of such recruits and to board invalid flying officers. Since this duty would occupy only a portion of Major Kellaway's time, the D.M.S. instructed him to approach Dr. H. H. Dale, F.R.S., whose department of National Institute of Medical Research was then housed in the Lister Institute. Dr. Dale gladly agreed to take Major Kellaway into his laboratory and this officer worked under his direction until early in 1919 on the effects of rapidly developed anoxaemia (as in flying at high altitudes) with special reference to the output of adrenaline from

¹² The apparatus for delivering oxygen to the flyer provided a problem which took two years to solve. See *British Official History, Diseases of the War, Vol. II, "Medical Aspects of Aviation"*.

¹³ Lt.-Col. C. H. Kellaway, F.R.S.; later, Director, Walter and Eliza Hall Institute for Research, Melbourne, and Director of Hygiene, Army Headquarters.

the supra-renal glands. This work was carried out experimentally on animals by making them inhale mixtures of air and nitrogen and so rapidly reduce the oxygen present to a degree comparable with that produced in flying at high altitudes. Under such conditions there was an increased output of adrenaline, mainly due to stimulation of the central nervous system by want of oxygen, the effects upon the adrenals being produced by impulses through the splanchnic nerves.

A good deal of attention was devoted to the associated problem of increase in the amount of sugar in the blood caused by this stimulation and the resulting output of adrenaline, and it was suggested that the hyperglycaemic reaction to anoxaemia might furnish a useful test in the investigation of fitness of individuals for flying at high altitudes.

The formation in 1915 of the Australian Dermatological Hospital to deal with venereal diseases placed the treatment and prevention of those diseases on a "scientific" basis. The part played by the technical staff and laboratory of this unit in carrying through the formidable experiment in venereal prophylaxis undertaken by the Australian force is described in a special chapter.

**The Australian
Dermatological
Hospital**

Clinical medicine and surgery in the A.I.F. developed, perforce, along individual lines; physicians and surgeons taking such opportunity for special observation study and research as should offer within the British system. Their contributions were thus made in the ordinary course of military work. In the sphere of internal medicine, indeed, the work was so confined that opportunity for systematic observation and record were almost non-existent.

**Clinical research
in the A.I.F.
1. Internal
medicine**

Through force of circumstance the exact study and recording of clinical observations was in a great measure denied to Australian physicians. The Australian Casualty Clearing Stations and General Hospitals in France were there primarily to serve the purpose of evacuation, not of treatment. In Great Britain every Australian soldier went to British hospitals, special as well as general. The Australian Auxiliaries in England existed to implement the "six months' policy" of getting convalescents back to the front or to Australia. The Command Depots, again, were designed for the same purpose of movement, rather than of treatment, save of readily recoverable illness; and the hospital ships and transports were organised with the same intention. Not

till the Australian soldier reached Australia as an "invalid" did opportunity present itself for systematic clinical investigation by Australian physicians. And here (as will later be seen) for various reasons the opportunity was imperfectly availed of.

But though opportunity for research was thus greatly restricted the cold official records of the service show that routine practice was resourceful and fully scientific. Instances of this may be seen in the treatment of "D.A.H." in the Command Depots;¹⁴ the methods adopted for promoting rapid convalescence,¹⁵ and the treatment and repatriation of mental cases.¹⁶ And in fairness to one of the most intense and picturesque of Australian physicians there must be added the enthusiastic, if largely futile, endeavours of Lieut.-Colonel J. W. Springthorpe to assemble in No. 3 Auxiliary and treat by modern methods the cases of so-called "shell-shock", many of whom (as he demonstrated) were actually the product of ignorant or outmoded methods¹⁷ adopted elsewhere.

Lastly, hall-mark of authentic "science" is seen in the influence and observations of the Consulting Physician A.I.F.,¹⁸ Colonel Sir Henry Maudsley, as manifested particularly in the exceedingly responsible position of Senior Boarding Officer. Some record of his observations is contained in "reports" to the D.M.S., A.I.F., which are cited later.¹⁹

The obverse to Sir Henry Maudsley's work—and indeed to the work of the A.I.F. physicians in general—belongs to the history of Pensioning, and is dealt with in *Chapter XVI*.

Prima facie the history of scientific surgery in the A.I.F. as recorded in *Volume I* has little to commend it as an illustration of the quality of the Australian medical schools. But in retrospect both of readers and of the writer²⁰ there emerge features of great interest. The waste of Australian talent both in the M.E.F. and in the Egyptian Command were the same.

**Clinical science
in the A.I.F.
2. Surgery**

¹⁴ *Vol. II, Chap. xvi, p. 463.*

¹⁵ *Ibid.*, pp. 455 et seq ¹⁶ *Chap. xiv* of the present volume. ¹⁷ *See Chap. ii.*

¹⁸ The selection of Australian medical officers as consultants in the B.E.F. has been recorded in *Vol. II, pp. 314, 395*

¹⁹ *Chap. xiii and Appendix No. 4.* That the tradition set by Sir Henry Maudsley will be fully maintained in the second A.I.F. is ensured by the calibre of his successors, Hamilton Fairley, Consulting Physician, and C. K. Parkinson, Senior Boarding Officer.

²⁰ That volume was written without any expectation that there would be opportunity for critical retrospect of the nature here attempted.

Australia's two foremost surgeons, Sir George Syme of Melbourne and Sir Alexander MacCormick of Sydney, both of whom are part of Australian history, were pushed into, and retained in, backwaters where not only had their genius no scope but *they were unable to do surgery at all*. The reasons for this and for the sombre—the sordid—history of medicine in the Gallipoli Campaign were manifold. Medicine was at that time regarded by many Army authorities as a kindly instrument of social philanthropy, but one that became a nuisance when it demanded a part in the serious business of military arrangements.

Australia has bitterly resented the waste of men and the waste of time involved in these military ineptitudes, and is not likely to take any recurrence of such blunders without effective protest.²¹

The surgery of 1915, so far as Australia is concerned, is seen against this sombre background. Yet even the history of Australian surgery in the Gallipoli Campaign presents some highlights, particularly in the experiment of the *Surgical Team* made over a year before its time by Colonel Fred Bird and attempted in the face of hard and fast military establishments by Major Piero Fiaschi.

For a study of the reactions of Australian surgery to the staggering experience of the evacuation of wounded from Gallipoli the reader is seriously commended to the account given in *Chapter IX of Volume I*. It is believed that if he try to translate this experience in terms of the picture which has been drawn of Australian surgery at the outbreak of the war, he will find a reaction not unworthy of the tradition.

Much interest attached to the development on this front of the methods whereby the surgeon is enabled to "seek his case" rather than have to wait for it—a principle exploited by the French in 1917-18;²² and more recently by the Australian force in the Libyan Desert in 1940-41. In Palestine in 1917-18 this was made possible by the formation of the Desert Mounted

**The episode of
the Black Ships**

**The Eastern
Front**

²¹ *Vide* Howse's evidence at Dardanelles Commission.

²² *See* Vol. II, p. 362 and Appendix No. 14.

Corps Operating Unit, commanded by Lieut.-Colonel John Storey.²³

Organisation of surgery on the Western Front and the distribution of Australian surgeons has been described so far as it is possible within the scope set for this history.²⁴ In the opinion of the writer it is to be regretted that the scope did not include studies by specialists of particular technical branches of medicine and surgery, for at every level of evacuation on the Western Front from R.A.P. to Base Hospital the work done by Australian surgeons was acknowledged by the Consulting Surgeons of the B.E.F. to be of the highest order. The quality of the surgery of an individual, a "team", a school, or of a clinic is assessed chiefly by published results, or contributions to literature or to debate. The circumstances of military medicine largely precluded such evidence. This was accentuated by the conditions under which Australian medical officers did their work. On the Western Front Australian units—C.C.S's and General Hospitals—were part and parcel of the general organisation of the B.E.F., and in England the circumstances of the Auxiliaries made continuous surgical application and experiment almost impossible. Nevertheless, the Australian surgeon had, we may say, a "better spin" and was able to give scope to his scientific training and traditions of Australian surgery much more definitely than were specialists in internal medicine. General Howse, himself a surgeon of repute, was strongly imbued with the importance of making the surgery in Australian medical units as high in quality as possible. He was handicapped, however, not only by the circumstances under which the Australian Service worked, already fully described, but—as to surgery at the front—by imperfect liaison with the British Director-General at G.H.Q., and—in England—by the policy of returning to Australia cases unlikely to be fit for duty in six months. The first prevented him from keeping in touch with the trend of surgical technique and organisation at the seat of war.²⁵ The second necessarily caused him to disappoint the hopes of surgeons at the Australian Auxiliaries that they might be enabled to carry through

²³ Vol. I, p. 636.

²⁴ Vol. II, Chap. xi.

²⁵ See Vol. II, pp. 840-41.

a continuous scientific campaign of reparative treatment. How they took advantage of the limited opportunities that offered will presently be outlined. But first some reference must be made to the surgery of the front.

The story of Australian surgery on the Western Front is that of, first, the surgical departments of Nos. 1, 2 and 3 Australian General Hospitals and Nos. 1, 2 and 3 Australian C.C.S.'s; second, the "Surgical Teams" for C.C.S. work and the Australian Resuscitation Teams; and, third, the surgical consultants. Most of this has already been told in *Volume II*, where in particular a study was made of the development of the operating and resuscitation teams.²⁶

The Melbourne School of Surgery had produced in Hamilton Russell a surgeon of acknowledged genius in the treatment of fractures and joints. A number of his pupils made of their work in Australian C.C.S.'s and General Hospitals an opportunity for original and constructive thought. The treatment of fractures in No. 1 Australian Field Ambulance, under Lieut.-Colonel Shaw, in the Somme fighting (July-August, 1916) was highly commended by the Senior Consulting Surgeon, B.E.F., Sir A. Bowlby. Subsequently, at No. 1 A.A.H. Colonel Shaw made a special study of the treatment of fractures in their later stages. In 1917 No. 2 A.G.H. (Boulogne) specialised in the treatment of fractures of the femur. The result of observations by Lieut.-Colonel Victor Hurley and Major S. H. Weedon was embodied in a very important article.²⁷ Work in this hospital and No. 2 A.C.C.S. laid the foundation for the high reputation of Mr. Fay Maclure.²⁸

One of the major technical advances in surgery was that of the treatment of wounds of the large *joints*, which till the First World War had been the *bête noir* of the general surgeons. An article by another young Melbourne surgeon, Mr. Balcombe Quick, in the *Medical Journal of Australia*, 8th June 1918, was one of the best studies of this advance. A

²⁶ *Vol. II*, pp. 782-6.

²⁷ "Treatment of Cases of Fractured Femur at a Base Hospital in France," published in the *British Journal of Surgery*, Jan., 1919, Vol. VI, p. 351.

²⁸ See illustration in *Vol. II*, p. 364.

study of cerebral surgery written by Lieut.-Colonel H. R. G. Poate, who had special opportunity for such experience, is published later in this volume.

In England within the limits allowed by the "six months' policy" some admirable work was achieved. Here the casualties had reached the stage at which the immediate anatomical repair of wounds ends, and measures surgical and other for the restoration of function begin. Here lay one of the fundamental problems of war surgery, involving the striking of a balance between a variety of "constants"²⁹ more indefinite and variable than those governing the problem of immediate surgical intervention: anatomical healing, constitutional resilience, the elimination of septic foci, with risk of "flare" (on the one side) and the onset of anatomical, physiological, and psychical degeneration on the other. The stage at which reparative intervention might be desirable varies in different types of injury—amputations, un-united or mal-united fractures, muscle-tendon distortions, joint injury, nerve injury, anatomical disruptions (for example of face and jaws); and above all the ever present and too often insoluble problem of osteomyelitis, which from the end of the war till the present day has furnished incomparably the most terrible and heart-breaking problem of the post-war surgeon.

Of these, apart from routine problems such as un-united fracture and osteomyelitis, three gave opportunity for intervention—(1) injuries to peripheral nerves, (2) facio-maxillary wounds and (3) amputations.

Nerve suture. Chapter VI contains an account of work done, between convalescence and repatriation, in cases of injury to nerves, by Colonel A. Newton. In the same chapter are described the circumstances under which the surgeons of the A.I.F. were enabled to participate in the advances in *physiological prosthesis* (facio-maxillary injuries).³⁰ As to amputations, one of the positive contributions of the war to scientific medicine was that it made the provision of *artificial limbs* a major problem of the medical profession. The change of attitude toward the responsibility of the surgeon in the matter of fitting of limbs was positive and uncompromising.

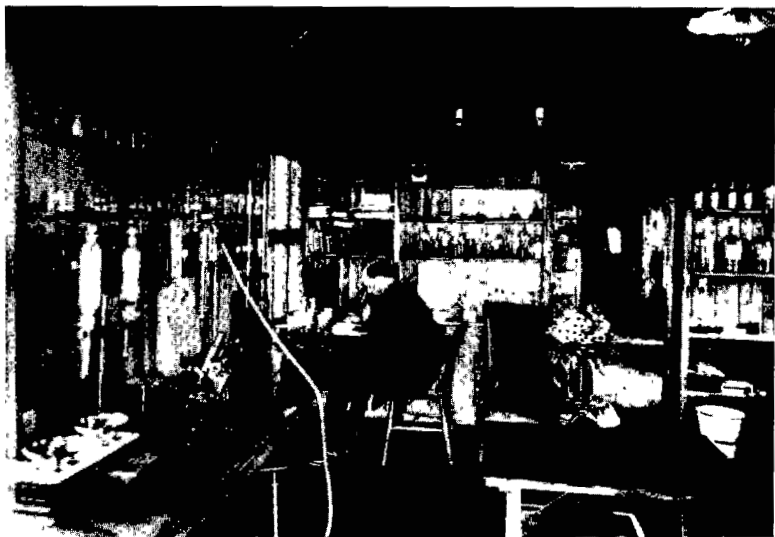
²⁹ See Vol. II, pp. 926-30.

³⁰ See also Vol. II, pp. 432-4.

The "six months' policy" supposed that every aspect of reparative treatment would be available to the Australian soldier in his homeland. Among the major involve-
The problem of the Australian limbless soldier ments was the provision of artificial limbs, and (as will be recorded later), during the war the need was imperfectly met in Australia. Overseas, small limb factories at No. 1 Auxiliary and, later, "No. 2 Auxiliary" (Southall) were created to meet the serious situation thus brought about. Though a makeshift, and administratively a source of much trouble, Southall yet served to create a scientific tradition. Advised by his expert there (Major H. O. Lethbridge) Surgeon-General Howse vigorously upheld two principles: (1) That, while there should be close collaboration, the surgeon and not the limb-maker was primarily responsible for the type of amputation. (2) That the same limb—and this the best possible—should be supplied free to officers and other ranks alike. The meeting of particular tastes and wishes was a matter for individual arrangement. This policy was rigidly adhered to in the Australian force. The most important technical aspects of the problem are the subject of a special study (*Chapter VI*).

Before closing these all too few notes on Australian scientific surgery in the Western theatre one other matter
A.I.F. and the Thomas splint deserves mention, since it illustrates the Australian surgical outlook more appositely, perhaps, than any other instance that could be selected.

There are occasions in the history of the medical profession when not law, nor literature, nor even the Church at its worst could show an attitude more intolerant toward new and free thought or more bitterly conservative of vested interests. The history of what we may term the Thomas School of reparative surgery at Liverpool University under Robert Jones furnishes an instance. Before the war, though a Mecca for foreign surgeons, it was almost wholly without honour among British surgeons, in particular those of the London schools. From this school came the idea of the Thomas knee splint, an apparatus constantly referred to in this work. In December of 1914—it will be recalled—an article by Mr. Robert Jones appeared in the *British Medical Journal*, among others on its use for compound fractures of the femur. "In this splint," he said in an



8. THE PATHOLOGICAL LABORATORY OF NO. 3 A G H AT ABBEVILLE

Major Eustace W. Ferguson at the microscope bench

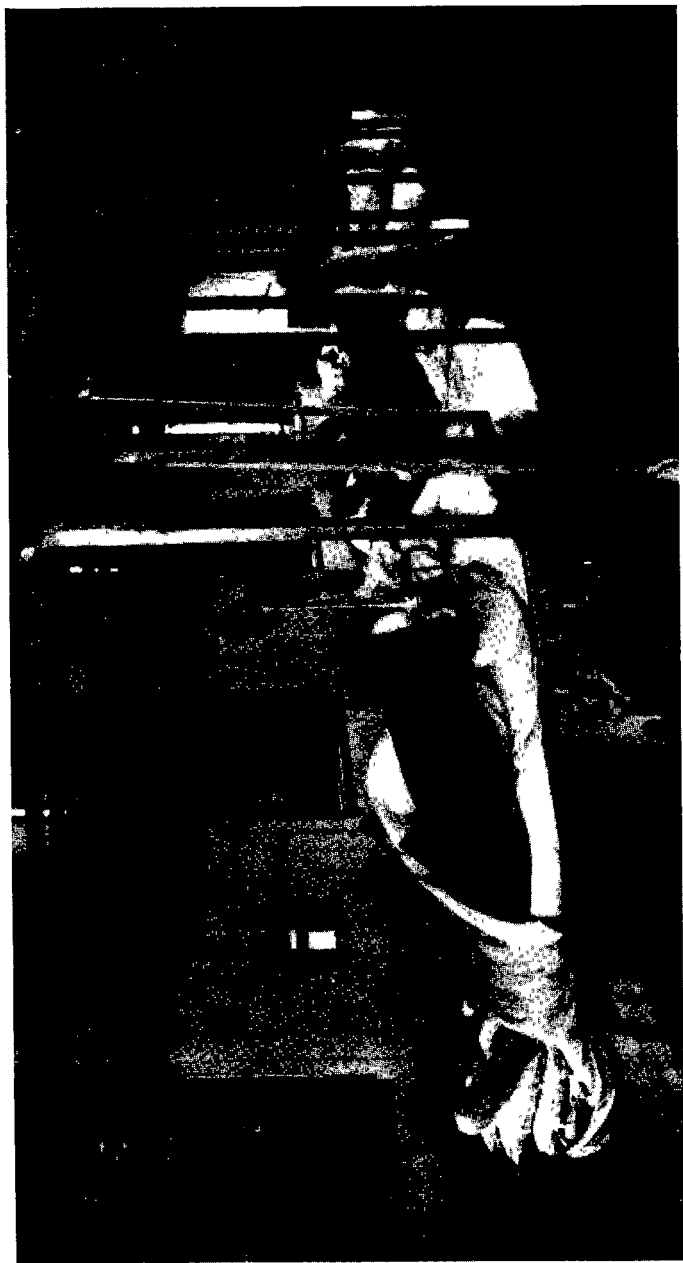
Aust War Memorial Official Photo No F2603



9. COLONEL C. J. MARTIN AT WORK IN THE PATHOLOGICAL LABORATORY
OF NO. 3 A G H, ABBASSIA. EGYPT, 1916

*Photo by Corporal A W Savage
Aust War Memorial Collection No J1669*

To face p 280



10. FRACTURED FEMUR WARD AT No 2 A.G.H., BOULOGNE, 1917

No. 2 A.G.H. specialised for a time in these cases

arresting phrase, "I have often put up a fractured femur and have sent the patient home in a cab." It was not till the beginning of 1917 that effect was officially given to this advice. But three Australian medical practitioners drawn from civil life into the war under widely different circumstances observed this article in 1914. The reaction, in each case identical and characteristic of the Australian outlook, may be summarised as follows:

(1) One of these officers was R.M.O. of an infantry battalion. The day after he read the article he cabled a sum of money to a friend in England for a supply of these splints to carry on his Maltese cart. Unhappily they arrived in Cairo on the day of the Landing and the R.M.O. saw none of them.

(2) Mr. Fred Bird, an able Melbourne surgeon, whose "team" made picturesque as well as scientific history, also read the article. His action was more direct and effective. He bought up the whole supply in Egypt. His experience took him elsewhere than the front line—but it was all in the line of Thomas and Jones.

(3) The most celebrated operating surgeon that Australia has produced, who more than any other man has influenced the technical interest, Sir Alexander MacCormick, went to England about the outbreak of war and was early appointed Consulting Surgeon to the B.E.F. Base at Boulogne. He took with him to France a supply of Thomas splints. In February, 1915, he urged their use in the front lines³¹. Soon after he was transferred with No. 3 A.G.H. to Lemnos where his unsurpassed surgical genius was wasted.

Early in 1915 the committee responsible (under the British D.G.M.S. Sir Alfred Keogh) for promoting the medical history of the war took up the matter of collecting specimens illustrating disease and injury. From

**Museum
collection**

1914 onwards this committee had been, on the scientific side, practically submerged in the Medical Research Committee whose Secretary, Sir Walter Fletcher, F.R.S., was associated in the secretaryship of the History Committee. The War Office, for the M.R.C., issued a circular calling for specimens for a "State" collection.³² An arrangement was made whereby the Royal College of Surgeons undertook the temporary housing and the indexing of the specimens sent in. The "Conservator" of the Hunterian Museum of the College was Professor Arthur Keith, F.R.S., who has so eminently carried

³¹ See Vol. II, p. 315.

³² Specimens "which illustrate the mode of production, the variety, the pathogeny, the manner of healing, and the results of treatment of wounds and injuries inflicted in the present war". The mode of preservation recommended was the well-known Kaiserling method.

on and developed the spirit and method of its great founder.

In December, 1915, General Keogh noted that the immediate results "have been disappointing. In certain hospitals and medical schools pathological specimens are at present being mounted and stored contrary to instructions". He realised that the object in most cases was the commendable one of immediate research and education, which would be impracticable if the specimens were sent to the Royal College of Surgeons Museum. Accordingly, while reminding "all medical officers that pathological material from military hospitals is the property not of any individual but of the State" he agreed to "recognise as fully as possible, subject to the paramount interest of the State collection, the claims of the local institutions" and promised, if possible, to provide the local institutions with "duplicate preparations". "The collections for the Canadian Contingent," it was added, "will be regarded as analogous to those made at local centres in Great Britain. A local centre may be recognised in Egypt partly to collect material from the Mediterranean Forces but also to form a collection for the Australian and New Zealand Medical Corps."

This was received and noted by Surgeon-General Williams, but there is no record of any action taken by him. It is to be regretted that no permanent specimens were prepared from the instructive series of post-mortems made at No. 3 A.G.H. or by Professor Watson in Egypt in 1915: for example, of the peculiar pneumonic conditions that so greatly impressed and puzzled the Australian physicians at Mena and Heliopolis. The Australian Service at the time was thinking rather of the winning of the war than of recording its experience. General Williams had not the outlook that would interest him and there had not been appointed, as was done in the Canadian Service, a scientific adviser and specialist to direct the less immediately utilitarian responsibilities of the service.

On reaching France, however, in 1916, various A.A.M.C. officers with special bent began to collect specimens with a view to enriching the museums of their own schools. Lieut-Colonel Newland, in particular, at No. 1 A.C.C.S., was early in his appreciation of the importance of the matter.

At the end of that year Lieut.-Colonel Elliott, F.R.S.,

R.A.M.C. was appointed by the War Office to represent the Medical Research Committee on the Western Front in its work of improving and extending the scope of clinical records and the collection of specimens and drawings for the Imperial War Museum. The appointment had a most stimulating effect. General Howse also took a keen interest in the matter and at the end of 1916 wrote to each Australian unit in France and Egypt pointing out the inadequacy of the Australian collection and urging greater effort.

During 1917 the interest of the A.A.M.C. greatly increased. At No. 2 A.G.H. Captain Inglis, the Pathologist, began the systematic collection of specimens on a definite plan of illustrating special injuries and their effects from every aspect—causation, anatomical features, pathology, healing, and so forth—associating together preparations of soft parts with the bony injuries and X-Ray plates and microscopic slides and with careful notes of clinical features so as to make for each case a complete picture.

In 1917 the D.M.S., A.I.F. appointed Colonel Newland to go into the question of the efficiency of the steps being taken for the collection and preservation of such specimens which had hitherto been carried out entirely under the British organisation established for the purpose. The policy laid down by him was that "all specimens must be selected with the definite object of their utilisation for teaching purposes, and of illustrating war conditions, with a view to education and action and not only for spectacular interest: and that all specimens illustrative of each important condition should be forthcoming for each of the three medical schools in existence, with provision for three additional". It was noted that this should be followed up by the collection of specimens illustrating the further history of the conditions after the return of the cases to Australia.

Towards the end of the year Major Inglis was seconded, worked under Professor Keith, and was enabled to obtain fuller acquaintance with the very careful and elaborate methods of preparation without which the specimens were entirely valueless.

The Australian War Records Section took the matter up, and an official artist, Lieutenant Daryl Lindsay, was attached in order to illustrate plastic work on the face.

At the end of 1918 a small number of specimens were taken to Australia by the Medical Collator to test, through the tropics, the method proposed for their transport. Liaison was made with the medical schools and the co-operation of Curators of Museums assured. In England the tedious task of packing the specimens for their long voyage began.

At this stage there arose the questions of the transfer of the collection from the Royal College of Surgeons Museum, and its disposal in Australia. There were listed at the Royal College of Surgeons 727 specimens collected as follows:

No. 1	A.C.C.S.	148	No. 1	A.G.H.	78	No. 1	A.A.H.	25	Total
" 2	"	98	" 2	"	113	" 2	"	—	
" 3	"	193	" 3	"	67	" 3	"	—	
" 1	A.D.H.	—	" 4	F. Amb.	2	Queen's Hosp. (Aust. Sect.)			
							3		727

Of these, Captain Inglis found that some 70 had been removed for preparation and inclusion in the "Imperial" collection in accordance with the terms of the War Office memorandum. Major Inglis, pointed out that a collection in Britain was of no practical use to Australian schools and many of the specimens had been collected and sent in under great difficulties and in the confidence of their forming part of Australian collections. Professor Keith pointed to the understanding on which the collections were accepted and cared for, and the laborious preparation and mounting for which Australia had not in the first place made any arrangement. The difficulty was solved by the Department of Defence offering the seventy specimens as a gift to the Imperial collection, while Professor Keith offered to supply, if possible, specimens of conditions found unrepresented in the Australian collection. The collection from London was despatched for Australia under Major Inglis, and the Egyptian collection under Major Ferguson. They are to-day in the medical schools of Sydney, Melbourne and Adelaide.³³

³³ The Sydney collection was used in connection with a successful meeting of the B.M.A. in 1922, when, basing their remarks on selected specimens from the museum, Lieut.-Col. Edye gave an account of the treatment of Head Injuries, Maj. Inglis of Gas Gangrene, and Dr. Marjory Little of Bacillary and Amoebic Dysentery. The Melbourne collection includes castings, drawings, and paintings illustrating the features and treatment of face and jaw injuries. Some of these have been used to illustrate the article by Sir Henry Newland in the next chapter.

SYNOPSIS OF CHAPTER VI

SOME SURGICAL PROBLEMS OF REPAIR AND RE-ENABLEMENT

Introduction: The scope and purpose of the chapter.

I. GUNSHOT WOUNDS OF THE BRAIN.

*By Group-Captain (formerly Lieut.-Colonel) H. R. G. Poate,
M.B., Ch M, L.R.C.P., F.R.C.S., F.R.A.C.S.*

II. THE TREATMENT OF WOUNDS OF THE PERIPHERAL NERVES—SOME EXPERIENCES IN THE WAR OF 1914-18

*By Colonel Sir Alan Newton, M.B., M.S., F.R.C.S., F.R.A.C.S.,
F.A.C.S.*

III. WORK OF THE AUSTRALIAN FACIO-MAXILLARY SECTION OF THE QUEEN MARY HOSPITAL, SIDCUP, ENGLAND, 1917-19.

*By Lieut.-Colonel Sir Henry Newland, C.B.E., D.S.O.; M.B.,
M.S., F.R.C.S., Eng., F.R.C.S., Edin. (Hon.), F.R.A.C.S.,
F.A.C.S.*

(With diagrams by Lieutenant Daryl Lindsay).

IV. AMPUTATIONS AND ARTIFICIAL REPLACEMENTS: LESSONS FROM THE WAR OF 1914-18.

*By Colonel Wilfred Vickers, D.S.O., V.D.; M.B., Ch.M.,
F.R.A.C.S.*

V. THE FINAL PROBLEMS IN WOUND-SURGERY: CHRONIC OSTEOMYELITIS, AND THE PHENOMENON OF LATENT SEPSIS—"FLARE".

By Lieut.-Colonel George Bell, O.B.E.; M.B., Ch.M., F.R.A.C.S.

CHAPTER VI

SOME SURGICAL PROBLEMS OF REPAIR AND RE-ENABLEMENT

THE original intention of the present history deliberately excluded a technical study of the *regional surgery of war wounds* as involving an undue extension in scope. Moreover it was rather in the general surgery of wounds, and the prevention of disease that the fundamental lessons and interests of the Great War for the medical profession lay.

When, however, the scope of the work was extended to three volumes it was decided to include a chapter on one specialised branch of surgery which, in its present-day form, is a definite outcome of the Great War—that namely to which the term “orthopaedic” is often applied but which may perhaps more properly be called the “general surgery of deformities”.

For in this branch of treatment the Australian Medical Service was faced with a very special problem. So far as the British School of Surgery is concerned, this department of it in the war of 1914-18 evolved under the creative impulse of the master mind of the “Director of Military Orthopaedic Surgery” in the War, Sir Robert Jones. The congeries of clinical problems and social issues which emerged from the General Hospitals as the finished product of the general surgery of wounds became the raw product for this branch of surgical activity; and “orthopaedic” or “reparative” surgery and treatment came to occupy a place among the medical problems and responsibilities of the war almost as important as the clinical crises of the field, and even more testing of the resourcefulness and “devotion to duty” of the medical profession.

In the course of their eventful itinerary from the time and place of their wounding until, more or less effectively reconditioned, they were reinstated in the civil environment from which they had been drawn, wounded men came successively within the ambit of a series of therapeutic systems.

In each of these they underwent some act of repair and were promoted to a higher plane of self-help. The early stages in the surgery of wounds—first-aid in the field, primary surgery in the C.C.S., and secondary surgery at the Expeditionary Base and in the hospitals in Britain—were elements in a continuous campaign of treatment whose prime objective was the *immediate healing of the wound*. It was when this was accomplished that there followed, for many, this hardly less exacting and diversified campaign of anatomical reconstruction and physiological re-enablement.

Sir Robert Jones laid down what may be called the "first and great commandment" of military orthopaedics, when he said:

The science and art of "orthopaedics" distinct parts, preventive orthopaedics and corrective orthopaedics. The latter is more especially the department of the trained orthopaedic surgeon. . . . The preventive requires the help of every surgeon who has to treat wounded men at any stage, especially the early stage.

And the second, "which also is like unto it" is this—

that "There is no definite operation which is essentially orthopaedic; there is no special appliance or apparatus which is the peculiar mark of the orthopaedic surgeon. A surgeon is judged good or bad from the orthopaedic standpoint by the results of his efforts to correct physical disability. Orthopaedic surgery is based on, and consists of, the recognition and practice of definite principles of treatment—whether operative, manipulative or educational—which lead to the restoration of function in deformed or disabled limbs or muscles.

"The orthopaedic mind thinks in terms of function. It has to deal with a pre-operative and a post-operative stage. The operative stage, although it may be essential, has only its proportionate value."

One of the few constructive results of the First World War in the field of medicine was its influence on this science and art. The imperious demand (1) for results, and (2) for conservation of energy in their achievement, brought about a close and continuous—one might say organic—correlation of procedure in the rescue and repair of the wounded man. This integration occurred at every stage of his evacuation and in every type of therapeutic intervention. The clinical problems of structural repair and functional restoration must be envisaged as the final phase in the course of evacuation for wounding—an experience which, in some form or other, was faced in the war by some

two million of wounded British and dominion soldiers, including 135,000 Australians.

In the Australian Imperial Force the emergence from General Hospital of the "raw product" for reparative surgery came at a very awkward stage in their careers as patients under treatment. By what was known as the "six months' policy" all Australian wounded "unlikely to be fit for duty within six months" were, with a few specified exceptions, sent home to Australia at the earliest possible moment. The clinical basis for this policy was, as already explained, a recommendation made in 1915 by the consultant surgeons to the A.I.F. Colonel Sir Alexander MacCormick and Lieut.-Colonel G. A. Syme. In response to a request by the D.G.M.S. in Melbourne, Surgeon-General Fetherston, Australian Military Forces, on his tour of inspection in 1915, these officers investigated the problems involved in the treatment of and disposal of Australian wounded in England, and advised as follows:

1. Cases of chronic bone-sepsis—can be sent at once to Australia for treatment, provided that they can have surgical treatment on the ship.
2. Cases of mal-union or non-union of fractures—as a general rule, can be sent at once to Australia for treatment.
3. Joint injuries—can be sent at once to Australia for treatment, provided that they are transported on ships equipped with facilities for massage, simple electrical treatment, etc.
4. Injuries to nerves—each case should be investigated by a neurological expert. Cases which in his opinion require immediate operation should be operated on at once, and sent to Australia as soon as the wound is healed. Facilities must be provided for their continued treatment on the ship by splinting, massage, electricity, etc. All other cases to be sent to Australia at once with same proviso.
5. Cases requiring plastic and restorative work—should have it performed in Australia, except such cases as are likely to be able to return to the front soon after operation.
6. Amputation stumps—should be sent to Australia at once for further treatment and attention there.

As will be seen later, not all these recommendations were carried out; but in general they governed the procedure. And thus it was that in the Australian force this second surgical campaign began in England in the Australian Auxiliary Hospitals and in No. 2 Command Depot; but from there it had to be continued, usually at an early date and so far as opportunity could be compelled, on the hospital ships and transports taking

the wounded man to Australia. It was completed in Australia, where it merges with the many physio-therapeutic treatments and manipulations, vocational trainings, and prosthetic re-fittings, the purpose of which was to reinstate the soldier as a useful member in the social system.

It is chiefly with the surgical treatment referred to in the memorandum of MacCormick and Syme that this chapter is concerned—by means of contributions from the pens of some of the Australian surgeons by whom it has been in no small part carried out. These contributions deal only with the technical problems of the first stage of repair, although some of the effects of this surgery are followed through to their latest ascertainable results in Australia. But the problems of co-ordination and of its interruption by the wide changes in place and condition are discussed later, in the chapters concerning transport and repatriation.

In the whole campaign of repair it is possible to identify three more or less self-contained though over-lapping agencies, namely—(1) Reparative (“orthopaedic”) surgery, (2) the various forms of therapeutic intervention of a less searching kind, which had come to be comprised in a general term “*physical therapy*” and which were carried out, for the most part, by members of special technical callings represented in the army by the Massage Service. (3) Implementing these, and their consummation, came the re-education of muscular action, through the various forms of “*remedial*” exercises and *reparative and vocational training*; these passing naturally into technical education and exercise in some economic occupation.

The problems involved in these three domains of therapy which (as will be observed) are “medical” in a decreasing progression until at the last they merge with those of normal peacetime apprenticeship should, under the scheme proposed, have been dealt with separately. The first, and the most important of these is that of “*orthopaedic*” or “*reparative*” surgery, and its immediate physio-therapeutic involvements. The other two subjects—*physical therapy* and *re-education*—are dealt with as far as thought necessary in this history in later sections.

It may here be said that in these final stages of treatment the necessary correlation was imperfectly achieved—a circum-

stance which represents, perhaps, the most serious failure of the Australian Medical Service in the war, and one that provides a most imperative "lesson".

It is not proposed to present, even in outline, an historical picture of the evolution of "orthopaedic" or "reparative" surgery during the war; nor even to make a study of all of the major technical problems which comprise the clinical and professional *corpus* of "orthopaedics". Much less does it set out to define the scope in war or peace of this new specialty. Instead, a selection is made for particular study from those types of injury which were specified by the Australian consultants as creating special problems for Australia. From these, *ex pede Herculem*, the vast problem of surgical repair may be envisaged. The most obvious omissions concern the restoration of movement by the *reunion and/or transplantation of tendons*; and the *repair of un-united or mal-united fractures*.

Though not strictly "orthopaedic" the physiological and biological facts and principles involved in the *repair of facio-maxillary injuries* and even the technique employed are identical with those which are involved in the surgical repair of the body and limbs. The *surgery of brain wounds* also, with which the chapter opens, though it does not come within the scope of "orthopaedics" is intimately involved with that specialty, both in its purpose and its problems; concerned as it is essentially with the restoration of function.

I

GUNSHOT WOUNDS OF THE BRAIN

By *Group-Captain (formerly Lieut.-Colonel) H. R. G. Poate, M.B., Ch.M., L.R.C.P., F.R.C.S., F.R.A.C.S.*

A list of references to authorities on which this article is partly based is given at the end of it.

In order to obtain a comprehensive view of the progress made during the Great War in the treatment of war injuries of the brain it is necessary to review briefly the state of our knowledge of such injuries as at August 1914.

The study of ballistics was confined to a very few, although Sir Victor Horsley in 1895 investigated the results of projectile

action by firing bullets into damp modelling clay and filling the cavity so caused with plaster of Paris. He con-

Ballistics

cluded that the so-called "explosive" effect of a rifle bullet is directly proportional to the sectional area of the bullet, its velocity and to the amount of fluid present in the tissues traversed; also that the forces of disruption act at an angle (which is indeterminable) to the axis of the bullet's flight and that the rotatory movement of the bullet is the most important factor in producing the pathological effects. The main factor in destruction of tissues is the high velocity and rapid spin, and not the "turning" which occurs only when velocity is lost, and after penetration some distance into the tissues.

The pointed bullet was introduced by Germany in 1905, and in 1910 Professor Fessler of the Bavarian School of Musketry published the results of his experiments, chief of which from a practical point of view were:

1. The bullet seldom breaks up and cannot be classed as "explosive".
2. The centre of gravity lies in its posterior third, so that after meeting resistance it almost always turns round a vertical axis running through its centre of gravity. The closer the range the less is the resistance required to initiate this change of movement.
3. The kind of wound produced depends mainly on the position of the bullet when it strikes the object, and to a lesser degree on the range, *i.e.*, its velocity. "Explosive" effects occur up to 700 metres.
4. When it strikes soft tissues "point on" the entry wound is small, but the track is larger than the calibre of the bullet, and its walls are raw and lacerated. Hard bones are perforated and numerous radial fissures and splinters caused. Soft organs are ploughed up. Entry wounds in hollow viscera are small but exit wounds larger.
5. When it strikes "broadside on" the track in soft tissues is much larger, and the walls are pulped while the exit wound is large. At anything up to 700 metres range, soft organs are torn and pulped, bone is pulverised and fragments are driven into the soft tissues, forming a cavity. At longer ranges the bony fragments are larger, there is less pulping of the tissues, and the bullet may remain in the tissues.

From the surgical point of view these findings pointed to the need for:

- (a) large first field dressings, (b) provision of means for control of haemorrhage and of (c) ample and efficient splints, (d) an increase in amputations, (e) expectation of much severe internal haemorrhage and of (f) the escape of stomach and bowel contents in all wounds of these viscera.

This experimental work anticipated many of the actual

features of wounds in the First World War, especially those of the head, where the semi-solid brain containing and surrounded by the cerebro-spinal fluid, is encased in a rigid bony shell, thus providing the conditions most favourable to extensive injuries. It is to be noted, however, that most of this experiment was done with bullets, whereas on the Western Front the greater number of wounds was produced by high explosive shells and projectiles whose effects exhibited the worst features of those made by low velocity bullets combined with greater destruction of soft tissues and an increased liability to infection. To this was superadded the effect of the actual explosion with its resultant disintegration, shock, burns, carbon monoxide poisoning, bruising and other injuries which might cause death without external evidence of wounding.

Admissions for G.S.W. during 1914 and 1915 from the Western Front, Gallipoli, Egypt and M.E.F. totalled 312,101.

**Frequency of
head injuries**

About 65 per cent. of the wounds were in the extremities. Next in frequency came head injuries totalling 37,754, or 12·1 per cent., a figure double that associated with any region other than the limbs. The actual number of head injuries suffered in the field is impossible even to estimate with any confidence inasmuch as so many resulted in death outright or within a few hours of the injury and before field ambulance was reached. Severe head injuries do not well withstand transport; even in 1917-18 when this became very efficient and casualty clearing stations were close to the front, many patients died during transport or soon after reaching the C.C.S. It is interesting to note that the percentage of G.S.W. of the head among officers is from 1·5 per cent. to 2 per cent. higher than in other ranks.

For 1915 records of Australian wounded who reached field ambulances or other medical units showed that head wounds were about 10 per cent. of the total, with a mortality of some 18 per cent. as against the average mortality for all cases of 6·8 per cent.¹ In 1916, 1917 and 1918 the total of wounded in

¹ Allowance must be made for the fact that all wounded evacuated from Gallipoli had to be transported, first down to the beaches, and then by barge or ship's boat to the few hospital ships available, but mainly—in the majority of cases—to "black ships" or "carriers" which were entirely unsuited for such work and inadequately staffed. Most men had then to suffer the several days' voyage to Egypt or Malta. It is surprising that so many withstood the ordeal, but the fact that most of the serious head cases died *en route* explains the relatively low mortality rate (18 per cent.) in the Base Hospitals.

the A.I.F. on the Western Front was 123,763 of whom 11,034 died of wounds. If the proportions that ruled in the Gallipoli Campaign held good this would mean that approximately 15,000 of these had head wounds, and about 2,700 would die.²

Although cranial surgery is a very ancient branch of the surgeon's art, cranio-cerebral surgery (or as it is now termed "neuro-surgery") in August 1914 was far from

Cranial surgery its present day development. The first deliberate
in 1914

operation for removal of a definitely localised cerebral tumour had been performed by Godlee just thirty years previously. Sir Victor Horsley was one of the great pioneers, and his visit and lecture to the medical officers at Anzac in October 1915 on Gallipoli, was a memorable event. The influence of Harvey Cushing also was being felt and these two men had inculcated the essential principles of cranial surgery among the younger men. Later, in France, as will presently be told, Harvey Cushing was responsible for further advances in this technique. In the earlier part of the century the outlook upon injuries of the head was dominated by concern with fracture of the skull and the associated "concussion of the brain". The physiology of the cerebro-spinal fluid and the peculiarities of the cerebral circulation, especially the importance of its venous side, were only just becoming understood. The nature of cerebral oedema, its control by physiological methods—such as posture, hypertonic solution and lumbar puncture—and the necessity for withholding surgical interference in certain cases and instituting it in others, were teachings of recent date.

In English, the only guide, from the practical side, as to the nature of treatment of G.S.W. of the skull was Makins' book *Surgical Experiences in South Africa*, published in 1901. Like the experimental work on ballistics already mentioned this dealt chiefly with the effects of bullet wounds and mostly at long range. Important points in it may be summarised as follows:

Injuries to the head were one of the most fruitful causes of death, both on the field and later in hospitals. Injury to the cranial bones without evidence of gross lesions of the brain was very rare, and the amount of brain damage as compared to the bony lesion was large. Makins' classification of the types of wounds was not helpful. He believed that extensive sagittal tracks or vertical wounds were nearly all fatal; vertical or

² These figures would not, of course, include the deaths at later periods to which reference is subsequently made.

coronal wounds in the frontal area were considered relatively favourable to recovery, while glancing or obliquely perforating wounds had the most favourable prognosis. The effects of various wounds as regards bony damage were minutely described and the cerebral damage was thought to be extended by the wave effect of the missile's passing through a more or less fluid brain substance.

In view of our experiences in Europe the following passage is of interest.

"Whether climate, the condition of the patients or peculiarity in the nature of causation of wounds was responsible, in no series of cases was the absence of acute inflammatory troubles more striking than in this one of brain injuries."

The condition described resembles those of earlier days in Gallipoli. Makins also says:

"When primary union of the skin flap and wound failed the process of definitive closure of the subjacent cavity was always a very prolonged one, and it was in such cases that a great proportion of the so-called herniae developed. Local abscesses formed in a considerable proportion of cases where serious damage to the brain had occurred. I never saw one develop where primary union had taken place even when bone fragments had not been removed."

He wisely concluded that operative interference is necessary in every case in which recovery is judged possible.

He advised raising a flap of the scalp with the bullet opening as the central point; if necessary the perforation in the skull was to be enlarged sufficiently to allow digital exploration of the wound. The area of brain injury had to be explored, all bony fragments removed, and brain pulp and clot washed away. The wound was closed without drainage. The advantages of early surgical interference in the case of head injuries were more apparent than in the case of any other wounds.

Where cerebral irritation occurred, or inflammatory *hernia cerebri* developed, a secondary operation was to be performed for the removal of bony fragments or the evacuation of pus—the results of such operations were remarkably good. Retention of a bullet in the brain was a rare occurrence.

Such then was the background of our knowledge as to the nature, effects and treatment of war injuries of the skull and brain when the Great War broke out. Unfortunately for the wounded, surgeons with actual experience of cranial surgery were then few.

On Gallipoli only first-aid measures could be attempted. Even on the hospital ships opportunity was slight—the ships

themselves were at first a rare sight and they accommodated only an infinitesimal part of the wounded.

**1915—
Gallipoli**

These had to be crowded on to transports where troops were often disembarking on one side as the wounded came in on the other. Medical and surgical stores and personnel were inadequate, consequently only operations of the most urgent nature could be attempted, and it was very seldom that head injuries could receive the attention they merited. Later sepsis became increasingly prevalent; but, though more suitable troopships were then allotted and facilities improved, the conditions were unfavourable for any deliberate surgery and only such cases as demanded a possible life-saving operation were submitted to active interference.

One of the earliest authoritative statements of the position as regards cranial war surgery is an article in the *British Medical Journal* of 27th March 1915 by Sargent and

**1915—
France**

Holmes, who began work in France in October, 1914, and exercised a great influence in this field of surgery. In view of developments in the later years of the war the main point for consideration is "what constitutes early operation?" This came ultimately to mean operation within six to eight hours of wounding but it is important to remember that in 1915 and 1916 the transport system did not generally permit of any approach to this possibility. Sargent and Holmes laid down that "the most important, and in many cases the determining factor in prognosis is proper early treatment before the wounds have become septic" and as time went on, this principle became more and more forcibly impressed on all surgeons as did another point emphasised by them "the most important factor next to this is whether the dura has been opened or not".

Sargent and Holmes held that, contrary to the old policy of leaving cranial wounds alone, there was urgent necessity for an early and thorough operation in all such cases. Sir Victor Horsley commented that sepsis was primarily, and in most cases, due to incomplete disinfection of the original wound, but that it, in turn, was allowed to develop as a result of the fatal and detestable practice of leaving head cases alone; he attributed the persistence of this wretched tradition to the fact that such cases had on odd occasions recovered, but condemned the policy

as the outcome of ignorance as to cerebral function and the principles of modern surgery. In his lecture at Anzac in October 1915 Horsley expressed similar views.

During the early years of the war in France head cases were sent to Base Hospitals. When Sargent remarked that the excellent transport allowed many even of the severest cases of head wounds to reach the Base within a short time after infliction of the wound, he probably meant anything from ten to twenty-four hours.

The classification of wounds penetrating the dura was (*a*) glancing wounds, or where entry and exit wounds are very close, forming practically a single lesion; (*b*) wounds where the missile was retained; and (*c*) those in which the missile had traversed the cranium.

Class (*a*) was the type most commonly seen at the Base, and such wounds were frequently septic. Dressings of cyanide gauze wrung out of 1-40 carbolic with 5 per cent. saline were used for two or three days before operation. Immediate operation was performed only if the patient remained deeply unconscious or showed any signs of compression. Sargent advised the turning down of a flap with the wound in its centre and laid it down that the suture line must never lie over the exposed brain. He advised a wide bony opening so that if *hernia cerebri* should develop it would not become strangulated, and also in order to relieve intracranial pressure. Attempts were made to cover the cerebral injury and shut it off from the septic scalp wound by using Cargile membrane, a dural flap or a pericranial flap and leaving the original scalp wound unsutured after it had been excised. If drainage was used he advised a glove drain which might be brought out at one of the lower angles of the flap incision.

With regard to wounds in class (*b*) with a retained missile the foreign body was to be removed if possible. Sargent and Holmes were not able to ascertain the ultimate fate of retained missiles, but suggested the later development of encephalitis or of a localised abscess. Wounds of the through and through variety, class (*c*), were treated on the same lines as class (*a*) for both entry and exit.

Reference is made to secondary operations for the removal

of bony fragments either through the original wound or by turning down a new scalp flap. If *fungus cerebri* developed it was always due to sepsis and was a most deplorable incident.

Horsley classified *hernia cerebri* as being (a) aseptic due to oedema with increased intracranial tension, and (b) septic. He advised treating it with absolute alcohol and cutting it away as the surface necrosis.³

For the relief of increased intracranial pressure Sargent and Holmes advised bi-lateral sub-temporal decompression. This might be supplemented by lumbar puncture but a warning was given as to its indiscriminate use; in the main it was reserved for non-penetrating wounds of the dura; in case of penetrating wounds it was recommended only when adhesions of the meninges around the wound could be expected to have become firm and unlikely to carry away if the brain retracted.

Sargent and Holmes drew particular attention to wounds of the superior sagittal sinus. In such cases they were chary of operating because of the difficulty in controlling haemorrhage. They advised turning back a big flap, removing a wide area of bone around the depressed portion, and then, when all was clear and accessible, the removal of the indriven bone and the control of haemorrhage by a stamp graft of muscle or aponeurosis. They were against the use of gauze plugging if at all avoidable. It was pointed out that the paralyses resulting from sinus injury were generally of the proximal segments of the upper limbs and the distal segments of the lower limbs, with rigidity as a marked feature, effects very different from those of direct injury to the cerebral tissues.

Writing from France in 1915 Cuthbert Wallace commented on the lack of unanimity regarding the treatment of head wounds, a discordance increased by the fact that some of the cases reached the surgeon within very few hours of their wounding, and others not until later stages when sepsis had set in and many of the more serious cases were moribund. There appeared to be two schools of thought—one conservative, intervening as

**New outlook
begins**

³ It is unfortunate that the terms *fungus cerebri* and *hernia cerebri* should have become synonymous, for the former is invariably due to sepsis and the latter may be wrongly diagnosed when cerebral wounds have been covered with a scalp flap and sepsis supervenes.

little as possible, the other a limited school of neuro-surgeons who, with a realisation of intracranial physiology and pathology, favoured immediate surgical interference of a bold and extensive nature.

Belgian and French surgeons, especially Billet and Delorme inclined to conservatism as regards early treatment at a C.C.S. and left major surgery to the Base when shock oedema and sepsis had subsided, although in the meantime many patients died. On the German side Professor Tillmann remarked that previous wars had not taught military surgeons to treat skull wounds on any generally accepted principles. He regarded tangential wounds as the most common⁴ and recommended immediate treatment under local anaesthesia. Enderlen had a mortality rate of 48 per cent. and only operated when patients could be kept for three or four weeks.

Colonel H. M. W. Gray in August 1915 published the detailed technique for the excision of wounds and stressed the necessity for complete *débridement* and then primary suture, a practice he had initiated in November 1914. He cited the results obtained and urged such treatment especially for furrowed wounds of the skull. Only with sepsis definitely established did he counsel a waiting policy of some forty-eight hours, during which intensive salt packing of the wound was carried out. Gray's results and teachings gave a great stimulus to surgeons dealing with all types of wounds, but especially so as regards head cases.

Two of Colonel Gray's students, Captains J. E. H. Roberts and George Tabuteau, in October 1915 published most encouraging results. The latter drew attention to the necessity of shaving the whole head in case of multiple wound, and also of complete *débridement*. "It is difficult," he said, "to follow the arguments for leaving the F.B. alone, as, if it or any bony fragments are retained, they invariably cause sepsis."

Towards the end of 1915 Cuthbert Wallace expressed opinion that considerable progress had been made in the treatment of head wounds and a more uniform technique achieved. It had become understood that the brain was to be regarded less as a vital organ than as a tissue liable to sepsis when once

⁴ Obviously because very many of the others died on the field.

it has been injured. Apart from injury to vital centres, causing immediate or early death, sepsis was the major cause of mortality, and efforts must be made for its prevention or elimination without any consideration of ultimate functional impairment. It was noted that brain tissue had considerable power of resistance to sepsis, and that in this the meninges played a part by means of protective adhesions. Lumbar puncture was the best control of cerebral oedema.

The vital factors

Despite these observations Gray concluded that the trend was to conservatism. He expressed the opinion that early attempts to remove bony fragments or retained F.B's were accompanied by a grave risk of extending any existing sepsis or of increasing the actual brain damage. "The evil effects of retained fragments of bone or of a F.B. are more or less problematical, and the time to deal with them is when the fears to which they give rise are actually realised."

Thus in 1915, although many surgeons were adopting early and radical measures, the old conservatism still held sway and it was not until much later on that the real meaning of "early surgery" and its results became apparent.

In January 1916 Sargent and Holmes published further details of their experiences with head wounds. Apparently the factors already alluded to⁵ had rendered them more conservative, as they advise delaying intervention for three or four days until protective adhesions have formed. They still retained a flap approach after excision of the actual wound area, and recommended a rigid perforated tube to drain the brain injury, with a glycerine pack in the tube. They say that immediate operation would seem to offer the best prospects of recovery and prompt healing but for two special circumstances, (1) the ease with which the sub-arachnoid space can be infected and thus the risk of meningitis, and (2) the tendency towards the formation of *hernia cerebri*.

Progress in 1916

Colonel Gray in February 1916 defined the principles and practice followed at Base Hospitals and drew the following conclusions:

⁵ Sargent and Holmes speak of "immediate operation" but again it must be noted that this had a very different meaning from that subsequently attaching to the term. They worked at a Base Hospital, and they refer to the cases as they saw them on arrival. In this connection, cf. Vol. II, pp 317-18

1. Infected G.S.W. of the skull and brain require more careful consideration and prompt attention than similar wounds of any other part.

2. Sepsis can best be controlled or prevented by early and complete operation.

3. Permanent disability in most cases can be prevented by removing systematically any foreign material or bony fragments from the surface or substance of the brain whenever they are accessible to legitimate surgery.

4. By these precautions the immediate results in the saving of life, and more rapid restoration of function when such is possible, are better than those obtained by more conservative procedures.

5. The minimum of scarring in brain tissue is obtained and thus remote after effects are lessened.

By this time it had become established that bony fragments, even though not septic at first, tended to become so fairly rapidly and that shell fragments invariably carry infection. If, therefore, any operations were to be done near the front line they should be complete, and the patients retained for two weeks or so; otherwise action there should be limited to removing any visible foreign material, cleansing the scalp, applying suitable dressings and sending the casualty to the Base as quickly as possible.

It had also become recognised that the old teaching—that concussion with the attendant cerebral anaemia or cerebral oedema was a bar to early operation—was incorrect. *The earlier the operation the better, as cerebral oedema and shock pass off more quickly when physical defects are remedied, and pass off all the sooner the more thoroughly this is done.* It was now also generally realised that *early operation was the most effective bar to sepsis.*

In addition it was found that focal symptomatology could not be relied on as a guide to treatment or prognosis inasmuch as cases varied so greatly, and that it was wiser to be guided in any decision by the probable mechanical effects of the injury, and especially its potentialities for infection. It was now held advisable to excise even apparently simple scalp wounds so as to secure quick healing and to determine incidentally the condition of the underlying bone. Colonel Gray obtained healing by first intention in nearly all such cases.

He also drew attention to the necessity of opening the dura in cases showing any pronounced depression of the inner table

if the dura is found to be non-pulsating or muddy coloured by reason of a localised cone-shaped bruising or pulping of the brain tissue. This necrotic tissue being virtually a F.B. is an immediate source of irritation to the surrounding brain and liable to become infected and form a localised abscess or even lead to a spreading encephalitis. Drainage of cerebral wounds was found to be inadvisable unless there was definite pus, infected clot in the wound, an inaccessible and infected F.B., or profuse oozing from a seriously lacerated area. Gray recommended that if there was any doubt the wound should be drained only down to the dura for twenty-four hours, using jaconet or glove drains with salt infolded. He found rigid tubes harmful and considered they acted as a F.B. He also thought that to excise a wound *after* turning down a flap was merely courting disaster and pointed out that *fungus cerebri* was usually due to retained bony fragments or a F.B. which had become a source of infection.

Gray's results were based on the records of 392 cases treated with a mortality of only 14·8 per cent. No case died in which lacerated brain was free from purulent infection.

In July 1916 Captain A. W. Addinsell advised against opening intact dura for the following reasons:

1. There is no direct evidence that the brain underlying the depressed bone is pulped and useless beyond recovery.
2. If the underlying brain is damaged there is less risk of infection with an intact dura.
3. If there is evidence of increased intracranial pressure it is easily relieved by lumbar puncture.
4. The scar that is formed in the brain tissue as a result of the healing process is probably less likely to bring about serious remote consequences if the dura is not involved.

He also used flap operations and advised against the use of rigid drains.

A clear account of the current technique was given in November 1916 by Captain Earle Page, A.A.M.C., then at a C.C.S. in France.

All wounds are excised right down to the bone. If there is a fracture of the external table of the skull or an obvious simple depression we trephine—we usually find the internal table splintered and often depressed even though the missile has not penetrated the calvarium. If the dura is intact we leave it intact except where there are obvious signs of intra-

dural haemorrhage. If the dura is torn we usually enlarge the bone opening to give a clear half inch of intact dura from the bone edge, and always close the scalp over the open area with drainage at another point. These head cases we usually keep for a week. We have no X-ray apparatus and if the missile is not readily discoverable in the track open to the finger we do not make a prolonged search but place a tube along the track and lead out at the edge of the wound. Personally I think these head cases should be X-rayed here and that an X-ray plant should be part of the equipment of a C.C.S. There is no doubt that cases with F.B. removed from the brain at the start do much better than those in which it is not.

X-ray equipment was afterwards provided for C.C.S's.

It will be seen that during 1916 there was still great variance of opinion even in important details. But with a more or less stationary war had come improvement in transport facilities; casualty clearing stations were developing as operating centres; surgeons and nurses were becoming trained in treatment; and opportunities for the exchange of knowledge as to methods and results were being provided.

Slowly but surely out of the chaotic conditions the Consulting Surgeons were able to secure a broad outlook, and to advise the various operating teams of what was being done in other areas and of the results at the Base or in England.

With the dissemination of this knowledge came some clarification of ideas and crystallisation of technique. The year 1917 stands out as the period of greatest advance in the surgery of war wounds of the head. In February a booklet on the "Surgical Treatment of War Wounds" was issued by Surgeon-General

**Advances in
head surgery
in 1917**

J. Murray Irwin of Third Army with special reference to work at the C.C.S's, and was distributed to all medical officers. It was compiled from papers read and discussed at meetings of medical officers. Captain J. Anderson summarised the treatment of cranial injuries, and made a special plea for early and complete operative interference in G.S.W. of the skull. He defines "early" as being *the earliest possible moment after injury that a patient can be brought to an area where environment and staff are suitable for cranial surgery, such as at C.C.S.* It is implied that this means from four to twelve hours after injury and before sepsis has set in. By "complete" he means operation on the lines suggested by Colonel Gray. He quotes our French colleagues as saying "all wounds of the skull should be trephined at once, as

this is the operation of urgency *par excellence* in military surgery"—a marked contrast to their views in 1915.

Anderson had, since August 1916, adopted Colonel Gray's methods. His findings and advice are here epitomised as representing views and practice almost universal in 1917.

At quiet times all scalp wounds should be excised and the underlying bone carefully examined before suturing. At certain other times, however, it is out of the question to evacuate cases of cranial wounds with escape of brain tissue or those with definite signs of cerebral compression either from fracture or haemorrhage. These must be submitted to operation at the C.C.S. All doubtful cases should be retained for immediate operation if the surgical staff available is sufficient. Cases operated on should be kept for at least six days if the situation permits, but if a man must undertake a long journey to the Base he is more likely to travel safely with sepsis and pressure removed than carrying them with him. If owing to the demands on surgeons a case cannot be operated on within 16 hours, the patient will be better evacuated after dressing unless mere movement is likely to prejudice his existence.

The value of local anaesthesia in these cases had now (he stated), become recognised, and only in some 3 per cent. of cases was general anaesthesia necessary. It was preferable inasmuch as the operator could gauge much more accurately the general condition of the patient and the limits of legitimate surgery and post-operative shock became almost negligible. The major danger is sepsis. The whole head must be shaved after the application of a warm soap compress and then sterilised. After excision sufficient access can usually be obtained through an elliptical incision and the turning down of a flap is practically never required except for the removal of a F.B. from the brain through an unwounded area or in dealing with an extensive meningeal haemorrhage, or in a decompression operation.

For excision of the septic bone area a small trephine area might be made outside the soiled area and the excision completed with a skull-cutting forceps just wide of the soiled bone, or the task could be undertaken by the "nubbling" method, the forceps being frequently changed. Anderson considered the result equally good, but the former the better technique.

No head operation is complete which does not deal with non-pulsating brain or dura. An X-ray should be taken in all cases where a missile may be retained. If a F.B. or any bony fragments are present, they should be removed if within reach of the finger, which is the range of legitimate interference in most cases. If the track is too small to allow introduction of the finger, any attempt to remove the F.B. is contra-indicated without exact X-ray localisation. The use of forceps or a scoop is permissible only in extreme cases and with the greatest caution.

Drain down to the dura for 24 to 48 hours; if the wound is infected, drain direct to the surface; if clean, bring the drain out at one end of the wound after suturing the scalp over the damaged area. Wounds of the head showed a remarkable tendency to heal by first intention if gross sepsis was removed and pressure relieved; if left open they showed a tendency to become secondarily infected. An open wound often developed

fungus cerebri which can be taken as an omen of disaster and an associate of infection. The scalp wound, therefore, should be completely closed even if it meant a plastic operation. Lumbar puncture should be resorted to before any marked signs of intracranial pressure occur, and is a valuable means in preventing a spreading oedema of the brain; but the fluid should run slowly until 10 to 30 c.c. had been removed, the amount varying with the degree of pressure. The procedure should be repeated as necessary.

In July 1917 Captain Anderson wrote along similar lines in the *British Medical Journal*.

During the early spring of 1917 operating teams were fully organised with surgeon, anaesthetist, nurse and trained orderly. These teams could be concentrated at areas where their services would be most useful. Expert surgeons were thus sent from Base Hospitals to C.C.S.'s and a reorganisation of C.C.S.'s as operating centres had also been undertaken. They were grouped as close to the front as practicable, and centres were established for dealing primarily with head wounds, abdomens, and femurs so that wounded from main dressing stations could be drafted direct to the appropriate centre. Each centre would contain three C.C.S.'s which would admit in succession.

At busy times from four to eight operating teams would be at work continuously often doing from twelve to sixteen hours' duty in the operating theatre, with from twelve to eight hours off. Each team would deal with twelve to eighteen cases in the hours on duty. X-ray outfits had been installed and all major or doubtful cases were submitted for X-ray examination before operation.

These arrangements were fully tested during the Third Battle of Ypres. Between 31st July and 16th November the C.C.S.'s of 2nd and 5th Armies dealt with 119,664 patients of whom over 30 per cent. were operated upon, among these being approximately 4,000 head cases. The Base Hospitals reported that relatively few operations were necessary; and that there was a welcome absence of surgical complications, and a low death rate.

This state of affairs continued until the end of the war, except for the dislocation caused to units and transport by the great offensives in 1918. The time factor in the operation became recognised as most important and in this connection an

interesting event was the arrival on 4th June, 1917 of the celebrated American surgeon, Harvey Cushing, at the head centre at Proven.

All surgeons were anxious to see him at work on his first case but within a few hours it was realised he would have to modify his civil technique to war requirements. After operating on three or four cases without success he ceased, and spent some days in watching each team at work and enquiring as to results and details of technique. The average mortality rate at that time for G.S.W. of head with cerebral injury was 47 per cent. which was considered good for this class of wound. In his first 44 cases Cushing had a mortality rate of 54·5 per cent.; in his second series of 44 cases it was 40·9; and in the third 28·8. This very dramatic success he achieved by discarding his detailed civil technique and adopting the rapid method of the less fully trained war surgeons, at the same time introducing several important modifications in technique. He confirmed the value of local analgesia. His methods may be summarised as follows:

After excision of the wound the scalp was mobilised by S-incisions or triradiate incisions as necessary to secure closure. He introduced the block removal of the damaged bone area, using burr holes around the defect and then connecting them with bone-cutting forceps and removing the area in one piece. The indriven fragments were pieced together to form a mosaic so as to ensure certainty that all were recovered.

When brain had been damaged, or there were indriven bony fragments or a F.B., he cleared the wound by aspirating the pulped brain tissue and clot through a catheter attached to a Carrel syringe—in most cases the bony fragments could be withdrawn also, and, at times, the F.B. Any retained bone or F.B. could be located by the catheter and gently removed by forceps. The wound was then syringed gently with saline or Dakin's solution, and the scalp sutured, without tension, in two layers, aponeurosis and skin, avoiding the use of silkworm gut which was likely to cut in and become secondarily infected. A glove-rubber drain was used only if infection was feared.

Cushing pointed out that the only satisfactory treatment for *fungus cerebri* was prophylaxis by strict cleansing of the wound, and by the use of efficient dressings so as to prevent re-infection.

It used to be thought that wounds of the ventricle invariably led to death of the patient, but it was now found that a proportion would live if infection were prevented.

The C.C.S's were now established as the main operating

**The final
situation
1917-19**

centres and had all been reinforced with expert surgical teams. In busy areas eight operating tables were available. As each team was capable of dealing with at least 12 severe head wounds in its 12 hours on duty, a total of 220 to 250 patients could be dealt with in 24 hours. This, of course, involved a great increase in the bed state of each C.C.S. but extra nurses and orderlies had been made available. Moreover, transport both by motor ambulance and ambulance train having now been highly developed, it was rare for a hold-up to occur.

Coincident with this improved and stabilised situation and with the diffusion of knowledge of technique and results, there was a marked reduction in the number of publications. But in 1918 Captains W. J. Adie and W. Wagstaffe were entrusted by the Medical Research Committee with a statistical review of 656 cases of G.S.W. of the head—the results published on 13th June 1918 confirmed the general findings already outlined here.

In October 1919 G. Jefferson reviewed 170 cases associated with fracture. In 91 of these which had no dural penetration, no deaths occurred. In 79 with dural injury the mortality rate was 37·6 per cent. Jefferson's conclusions may be thus epitomised.

Fatalities, other than immediate ones, are mainly due not to toxæmia but to mechanical interference with the bulbar circulation. Bulbar anaemia is produced by a rise in intracranial tension brought about by (1) anatomical injury including haemorrhage whether subdural, sub-arachnoid, cerebral or intra-ventricular, or (2) infection with swelling of the tissues and the exudates inseparable from it, or (3) a combination of these two—which is the common cause. If the patient survives the initial injury and is able to compensate for the primary upset of intracranial physiology, the outcome will depend on the severity and extent of infection.

It is on these two fundamental factors of anatomical injury and sepsis that the expectation of life depends and that the attack on the problem of head wounds must be based. The main control available to the surgeon is over sepsis, which he has some power to regulate or restrain. Head wounds should, therefore, be operated on as early as possible; if, in a busy time, any are sent on to the Base, it should be those without dural penetration and with a pulse below 100.

The investigation confirmed previous findings, (1) infratentorial injuries are much more dangerous to life than supratentorial; (2) if cerebro-spinal fluid leaks from a *fungus cerebri* it is an ominous sign, the death rate in such cases being 75 per cent.; (3) local anaesthesia lessens shock, haemorrhage, and post-operative vomiting, and allows more convenient posturing. Moreover it enables patients to aid in expulsion of debris from brain wounds by coughing as required. It was noted that death occurred, on an average, 17 days after wounding, and was mainly

due to sepsis causing meningitis or ventriculitis. The bacteria present are similar to those in general wounds, but the most to be feared was the haemolytic streptococcus. Bone fragments indriven are in nearly every case heavily infected with both aerobes and anaerobes.

In this connection it should be noted that in 1918 field laboratories were made available at C.C.S.'s. The work there carried out was a valuable aid to the surgeon, and increased the chance of survival of the patients.

In April 1918 Harvey Cushing published a study based on his experience at a C.C.S. in France, setting forth his classification, detailed technique, and the results of 220 cases of G.S.W. of the head. The technique described had long since become generally accepted. His classification of wounds (according to the degree of severity) led to a clarification of the various issues involved and was as follows:

Group 1. Wounds of the scalp with intact cranium and dura. There were occasional underlying cerebral contusions. 22 cases, 1 death (4.5 per cent.).

Group 2. Wounds producing local fracture with dura intact, with or without depression of external table. Local contusions of brain or extradural extravasation of blood were fairly common. 54 cases, 5 deaths (9.2 per cent.).

Group 3. Local depressed fractures with dura punctured. Local contusions inevitable usually with positive neurological signs; cerebral extrusion uncommon. 18 cases, 2 deaths (11.8 per cent.).

Group 4. Wounds usually of gutter type, with detached bone fragments driven into the brain. Local contusion severe and extrusion of brain almost inevitable. *Fungus cerebri*, encephalitis, etc., were common sequelae. 25 cases, 6 deaths (24 per cent.).

Group 5. Wounds of penetrating type with lodgment of both projectile and bone fragments. Brain often extruding, contusion along track, symptoms depend on size and course of the missile. Common sequelae—early, compression; late, abscess. 41 cases, 15 deaths (36.6 per cent.).

Group 6. Wounds with ventricles penetrated or traversed. (a) by bone fragments. (b) by projectile. Cerebral lesions as in groups 4 and 5 with escape of cerebro-spinal fluid. Haemorrhage into or subsequent infection of ventricle common. Type (a) 14 cases, 6 deaths (42.8 per cent.). Type (b) 16 cases, 16 deaths (100 per cent.).

Group 7. Wounds of cranio-cerebral type involving (a) orbito-nasal, (b) auropterosal regions. Brain commonly exposed and extruding, radiating fractures, nasal or petrosal cavities opened, meningitis common. 15 cases, 11 deaths (73.3 per cent.).

Group 8. Through and through wounds with cranio-cerebral perforation. Extensive cranial and cerebral damage common. Death usually due to intracranial haemorrhage and compression. 5 cases, 4 deaths (80 per cent.).

Group 9. Cranio-cerebral injuries with massive fracture of skull. Widespread cerebral contusion. Compression phenomena common. 10 cases, 5 deaths (50 per cent.).

Major C. Horrox in July 1919 reported a series of 222 cases treated at a Base Hospital of which 90 were scalp wounds. The figures relate to one of those periods in 1918 when transport was seriously dislocated. At such times although operations were still performed, as far as possible, at the C.C.S's, many cases had to be passed on to the Base, and, to this extent, the position there resembled that of 1914-15. Some of Horrox's conclusions have been epitomised as follows:

There were 132 cases of fracture of which 101 had dural penetration. A striking feature was the large percentage of cases in which gas infection had developed; most of them arrived from 24 hours up to 4 days after wounding, by which time severe sepsis had set in. It is of interest to note that during one period of four months, primary suture was practised in penetrating wounds of the brain, and if any herniation occurred the wound was reopened in 24 to 48 hours. In this series seven out of twelve cases died, of which five had infection by *B. Welchii*. In the next 4 months similar wounds were left open, and only 4 cases out of 12 died. The result furnished a direct indication for the treatment of such cases when once sepsis is established.

As a result of the development of the surgery of head wounds during the war an established technique for use in civil cases was laid down with a corresponding betterment of pre-war results.

**Immediate
results of
operation**

That the results of operative treatment at the C.C.S. were superior to those at Base Hospitals was very apparent.

It is unfortunate that the published British figures are comparatively few. But taking the reliable and detailed statements of Cushing, Jefferson, Adie and Wagstaffe, and adding to them the results of a series of 90 operated on by the author, the following results are obtained:

1. Scalp wounds, 184 cases—mortality 1 per cent.
2. Local fracture with dura intact, 146 cases—mortality 5.4 per cent.
3. Dura and brain involved (all types), 415 cases—mortality 35.4 per cent.

For Base Hospitals the figures of Horrox, Adie and Wagstaffe, and Captains Newton and Brown (A.I.F.) give the following result:

1. Scalp wounds, 208 cases—mortality 0·4 per cent.
2. Local fracture with dura intact, 134 cases—mortality 8·4 per cent.
3. Dura and brain involved (all types), 379 cases—mortality 43 per cent.

These figures are probably a reliable guide to results in general from 1917 onwards. By then most surgeons concerned had obtained extensive experience—newcomers were put through an intensive period of training in this specialised work before posting to an operating team. The figures already quoted from Harvey Cushing in the detailed classification may be taken as the average for results achieved by all surgeons in this later period of the war.

Following on their period of service in France, Sargent and Holmes in 1916 published the results of their enquiries into the late results in 1,239 patients who had been returned to England.

The time that had elapsed since the wounding varied from two to eighteen months, but, after excluding those without definite bony or cerebral injury and also any cases in which the nature of the injury was uncertain, they fully investigated the history of 610, all of whom had been wounded over three months previously. Of the original 1,239 only 46 (3·7 per cent.) had died after evacuation to England, and this included many hopeless cases of whom nine died within two weeks of arrival there.

It was found that if death were likely to occur it nearly always did so within three months of the wounding; only five patients had died after this period of time. Of those arriving with "*hernia cerebri*" 24 per cent. died and of those with retained F.B.'s 6 per cent. In most cases death was due to sepsis causing cerebral abscess, meningitis, etc., and in 11 of the 46 it followed secondary operations.

Resultant physical disabilities depended on the severity and position of the wound. It seemed that much of the paralysis and sensory and visual disturbances seen in the early stages must have been due not to anatomical injury but to oedema and vascular disturbances, inasmuch as the amount of recovery that occurred after a few months was surprising. This was especially noticeable in the case of injuries to the superior sagittal sinus even where the original defects had been extensive.

It was found that only a very small proportion of head cases can return to military duty⁶ but a considerable number, even with severe head injuries, can lead active and useful lives. Other points in this report have been epitomised as follows:

Insanity was a very rare sequel, there being only two cases out of the 1,239 reported on; but many patients show some degree of mental deterioration, *e.g.* dullness, lack of power of concentration, loss of memory, irritability, childishness, etc. Most of these, however, improve, or even clear up in time. Headache in some form or other is the most common complication. There is usually a feeling of pressure and throbbing which is increased by excitement, noise or fatigue.⁷

Only 37 cases of epilepsy were found subsequent to severe head injury, and in four of these there was a retained F.B. Other neurological complications—various paralyses, sensory and visual disturbances, etc—were due to the primary cerebral injury or a result of sepsis or *hernia cerebri*. A very few had hysterical manifestations such as paralysis, anaesthesia and visual disturbances quite unrelated to the degree and site of the wound. In only 3 per cent. were the wounds not healed within three months, the most common cause of delay being *hernia cerebri*. In very rare instances delay was due to persistence of infection in the bone.

Of 124 cases of *hernia cerebri* (probably *fungus cerebri*) the mortality rate was 21·8 per cent. It is of interest to note that of these 124 cases, 14 had a retained F.B., and 96 had had a F.B. removed. Altogether 69 cases of retained F.B. were traced and only 4 died. Secondary operations may be necessary for cerebral abscess, *fungus cerebri*, retained bony fragments or F.B. but such operations show a mortality of 20·7 per cent.

As a result of this investigation Sargent and Holmes concluded that primary healing is the great objective in all G.S.W. of head or brain. Every possible step should be taken to prevent the development of "*hernia cerebri*", which is invariably the result of sepsis. It is unwise to attempt the removal of a F.B. unless it is readily accessible or is giving rise to definite trouble such as cerebral abscess. Taken as a whole they regarded the late results of G.S.W. of the head as being much more satisfactory than was expected.

Although no figures are available, the final results as seen by the writer in Repatriation hospitals in Australia must be regarded as very good. In many cases where important cortical

⁶ This observation confirms the report by Adie and Wagstaffe in 1918. Of their 222 cases only ten with cranial or cerebral injury were returned as fit for general service and another 28 as fit for light military duties, the balance being discharged as unfit for any Army Service.

⁷ The writer has recently seen a man with extensive injury to the right frontal lobe and a retained F.B., who was wounded in 1917 and whose only complaint is of occasional bouts of severe headaches.

areas of the brain have been destroyed the results include paralysees, visual disturbance, and sensory anomalies, but it is often surprising to see how much recovery in function has occurred with very gross injury to brain and wide bony loss. Such cases have long since become stabilised in their disability, and many of them can lead relatively active and useful lives. Perhaps the most disabling condition is that in which fits are of frequent occurrence. For about seven years after the war many such cases were met with, due apparently to adhesion of scar or scalp to the underlying cerebral tissue or the meninges. Usually there was a fairly wide bony defect in or adjoining the parietal region overlying the motor area. Most of these cases at the Prince of Wales (Repatriation) Hospital, Sydney, were subjected to operation at which the scar area was dissected away, adhesions separated from pia-arachnoid or damaged brain, and the area covered with fascia lata which was tucked under the bony margins and then overlaid with a split rib or other bone graft over which the scalp was sutured.

The results were most gratifying; in many cases complete cure from fits resulted, and in every case there was at least amelioration, in many, a great improvement. In such cases too when the bone defect had been filled the patient found an added sense of security and self confidence.

In many cases examined by the writer in 1918-19 he found retained bone fragments or F.B's but in no case has cerebral abscess been met with. The most common subjective symptom has been headache varying in intensity as well as frequency, but in very few cases does it incapacitate the individual for more than from twelve to twenty-four hours. The best relief is given by bromides and rest.

Looking back over twenty-five years one can say that, of patients with severe G.S.W. to the head involving the brain those who survive the immediate risk of the wound and the second danger period of the first ten days, and the third danger period of the first three months, can in most cases look forward to a relatively active life, free of late risk from the wound, and can be regarded as being of economic value to the State rather than otherwise. To civil surgery the great gain from the mass surgery in cranial wounds of the Great War has been the clari-

fication and standardisation of technique, and the training of many young surgeons who subsequently returned to civil duties.

REFERENCES

- Official History of the Great War—Medical Services—1922.*
Official History of the Australian Army Medical Services, Vol. I, 1930, Vol. II, 1940.
 1895 Sir Victor Horsley—*Proc. Roy. Instit. of Grt. Brit., Vol. XIV, p. 228.*
 1913 Makins—*Surgical Experiences in South Africa—1901.*
 1914 Sir Victor Horsley—*Brit. Med. Jour. 21.11.1914, p. 896.*
 1915 Sir Victor Horsley—*Brit. Med. Jour. 20.2.1915, p. 321.*
 Col. H. M. W. Gray—*Brit. Med. Jour. Aug. 1915, p. 317.*
 Sargent and Holmes—*Brit. Med. Jour. March 1915, p. 537.*
 "Correspondent in France"—*Brit. Med. Jour. 1915, Vol. I, p. 568.*
 "Correspondent in France"—*Brit. Med. Jour. 1915, Vol. II, p. 190.*
 Sargent and Holmes—*Brit. Med. Jour. 1915, Vol. II, p. 493.*
 Sargent and Holmes—*Brit. Med. Jour. 1915, Vol. II, p. 747.*
 Roberts—*Brit. Med. Jour. 1915, Vol. II, p. 498.*
 Tabuteau—*Brit. Med. Jour. 1915, Vol. II, p. 501.*
 "Correspondent in France"—*Brit. Med. Jour. 1915, Vol. II, p. 761.*
 W. Trotter—*Brit. Jour. of Surg. 1915, Vol. II, p. 520.*
 Sargent and Holmes—*Brit. Jour. of Surg. 1915, Vol. III, p. 475.*
 1916 Col. H. M. W. Gray—*Brit. Med. Jour. 1916, Vol. I, p. 261.*
 "Correspondent in France"—*Brit. Med. Jour. 1916, Vol. II, p. 256.*
 Addinsell—*Brit. Med. Jour. July 1916, p. 99.*
 S. Smith—*Brit. Med. Jour. July 1916, p. 102.*
 "Editorial"—*Brit. Med. Jour. 1916, Vol. II, p. 767.*
 Sargent and Holmes—*Jour. R.A.M.C. Sept. 1916, Vol. XXVII, No. 3.*
 1917 Anderson—*Brit. Med. Jour. 1917, Vol. II, p. 42.*
 1918 Adie and Wagstaffe—*Med. Research Council Stat. Rep. No. I, 1918.*
 1919 Horrox—*Brit. Jour. of Surg. 1919, Vol. VII, No. 10.*
 Newton and Brown—*Brit. Jour. of Surg. 1919, Vol. VII, No. 10.*
 Jefferson—*Brit. Jour. of Surg. 1919, Vol. 7, p. 262.*
 1929 Trotter—*Brit. Med. Jour. 21.12.1929, p. 1,157.*

II

THE TREATMENT OF WOUNDS OF THE PERIPHERAL NERVES—SOME EXPERIENCES IN THE WAR OF 1914-18

By Colonel Sir Alan Newton, M.B., M.S., F.R.C.S.,
 F.R.A.C.S., F.A.C.S.

During the early months of 1918 I was surgical specialist at the 3rd Australian Auxiliary Hospital at Dartford, a well equipped hospital of 1,200 beds to which wounded Australians

were admitted after treatment in Base Hospitals in Britain and from which they were distributed to depots either for embarkation for Australia or for further service at a base or in the field. As a general rule, men who had sustained severe wounds were not admitted to this hospital until some months had elapsed since the time they were wounded, and it therefore followed that, though much reparative surgery remained to be done, fractures had united and wounds had healed in the majority of the patients. It was obviously desirable to postpone much of this reparative surgery until after return of the men to Australia, but, in the case of wounds of the peripheral nerves, it was thought that the wise course of action was to operate when possible prior to embarkation in the hope that the total period of invalidity would thus be shortened.

This procedure was not possible in the case of men whose wounds had not healed and was, of course, contra-indicated in the presence of signs of regeneration in the affected nerve, so that men whose signs justified their inclusion in one or other of these categories were returned forthwith to Australia in the expectation that appropriate treatment could be undertaken soon after their arrival. There were 126 men suffering from wounds of the peripheral nerves who were under my care at Dartford; 68 of these were operated upon in this hospital and the remaining 58 were evacuated to Australia without operative treatment for one or other of the reasons just mentioned.

I have kept a private record of every patient upon whom I operated; conducted a "follow-up" investigation in 1920; and recently, by the courtesy of the Commonwealth Department of Repatriation, have reviewed the departmental files dealing with the progress, during the intervening twenty years, of every man, with the exception of one who cannot be traced. It is therefore possible for me to present a complete report of the methods adopted and the results obtained in the surgical treatment of 67 cases of wounds of peripheral nerves—a series which, though comparatively small, fortunately embraces every type of peripheral nerve injury—and to compare, when necessary, the condition two years after operation with that found many years later.

Before describing the methods employed in the treatment of

these cases, it is necessary to emphasise the fact that the problems associated with the treatment of wounds of the peripheral nerves inflicted in war differ materially from those encountered in dealing with similar injuries sustained in civil life. Primary suture was rarely possible under war conditions; and the prospects of successful secondary suture were diminished, in many instances, by the fact that there had been destruction of so much of the nerve trunk that approximation of the proximal and distal ends was difficult, if not impossible. Wounds caused by fragments of high explosive shell were usually extensive, were generally infected, healed slowly, and were replaced by a large amount of scar tissue which materially increased the difficulties of the surgeon at the time of operation (*see Plates A1 and A2*). Scar tissue also developed in the substance of the nerve and, if not removed completely, formed an almost impenetrable barrier across the path of the regenerating nerve fibres.

Nor were these the only troubles, for it frequently happened that there were associated lesions of bones, joints, vessels and other important structures in the limb, which so impaired its usefulness that it was hopeless to expect a good result even after successful nerve suture. All these factors must be borne in mind when considering the treatment of peripheral nerve wounds and assessing the value of the results of this treatment.

On admission to hospital, each patient was subjected to a thorough neurological examination in order to determine the degree of interference with the motor, sensory and trophic functions of the affected nerves. Photographs were taken of the limb after outlining the areas of loss of the various forms of sensation with a skin pencil. The electrical reactions were elicited and recorded, a task which in those patients whose limbs were oedematous and board-like after prolonged immobilisation in splints, could not be accurately accomplished until this condition had been improved by the usual methods of physio-therapy. Tinel's sign was sought for; the question of the existence of residual infection in the wound was debated; and, finally, a decision was made whether to operate at Dartford or to evacuate the patient to Australia in the hope that he would be in a better condition to undergo operation after the lapse of time spent during the voyage to that country.

Apart from the special features of each individual case of peripheral nerve injury, there are two general problems which all surgeons concerned with this work must consider, namely, *the optimum time after division of the nerve for the operation of secondary suture, and the time which should elapse after the healing of a wound before it can be reopened with safety.* It has been stated that the results of secondary suture performed four months after the date of infliction of the wound were not as good as those following suture performed six months after that time, owing to the fact that degeneration in the distal segment of the nerve is not complete until six months have passed. This statement is not supported by the results in this series in that some of the more successful operations were performed three or four months after division of the nerve; this question therefore seems to merit further investigation.

In regard to the second problem, it was generally recognised that, if an infected wound is reopened too soon after it has healed, post-operative infection may bring to naught the efforts of the surgeon to accomplish a successful nerve suture. It was suggested, as a general rule, that this operation should be delayed until three months after the date of healing of the wound, although, naturally, every case must be considered on its merits, special attention being paid to the degree of gross infection during convalescence. It was found at Dartford that in many cases operation could be undertaken at an earlier date without disaster.

The operative technique consisted in exposing the nerve for some distance above and below the site of injury through a liberal incision and then, by careful dissection, tracing it through the scar tissue, a step which, when much of this tissue was present, was both tedious and difficult. Bleeding was controlled by forceps in preference to a tourniquet, the use of which is probably harmful in these cases; care was taken to avoid injury to muscular branches issuing from the proximal portion of the divided nerve and the nerve trunk itself was handled with great gentleness. After separation of the nerve trunk from the scar tissue had been completed, it was necessary to determine whether it had been divided by the missile and should be treated by end to end suture, or whether it was merely involved in scar

from which it should be liberated—the operation known as neurolysis.

The technique adopted when there was a complete anatomical division of the nerve consisted in completely dividing the scar uniting the two ends of the nerve and then shaving it off in layers from each end until the cross sections of the nerve trunk above and below the area of the wound appeared normal. Great care was taken to remove this scar as completely as possible and it was found that the best instrument for the purpose was a safety-razor blade. When the two ends of the nerve could be approximated without undue tension fine silk sutures were placed at intervals around the circumference of the nerve trunk in such a manner that the greatest possible accuracy of apposition was obtained. As a general rule, these sutures passed only through the capsule of the nerve but when there was some tension after approximation, a single suture was inserted through the substance of the nerve in order to relieve some of the strain on the smaller sutures.

In those cases in which the loss of substance of the nerve was so great that end to end suture was difficult or impossible, it was necessary to resort to various expedients. The simplest of these consisted in flexing the neighbouring joints and, if this step made apposition possible, using splints to maintain this position until the wound was well healed, when the joint was allowed to extend by gradual stages. It is possible gradually to stretch the nerve in this manner though it has been suggested that in such cases it would be better to perform a two-stage operation, the ends of the nerve being united by a through and through suture inserted with the joints flexed at the first stage; the nerve being then stretched by gradual extension of the limb and, when this manoeuvre has been completed, accurate apposition being achieved at a second-stage operation. The results, in this series, of one-stage suture after approximation had been made possible by acute flexion of neighbouring joints, were disappointing and indicate that it might have been preferable to replace this procedure by the two-stage method just described. Another procedure was to transplant the nerve trunk in such a manner that its course was shortened; a method which was adopted in two cases of ulnar nerve division in the arm, the

distal portion of the nerve being transplanted to the front of the elbow joint in each case.

When the gap in the nerve trunk cannot be bridged by adopting one or other of these methods, the best expedient is the use of a nerve graft. Portion of the internal cutaneous nerve of the arm was used as a graft to restore continuity in the ulnar nerve in one case in this series, with the result that some evidence of regeneration was noted. The portion of nerve trunk used for the graft was divided into several strands which were sutured separately—a procedure dictated by the fact that better nutrition of the graft can be achieved if it is separated in this way than is the case if it is sutured intact to the two ends of the divided nerve.

Finally, in two cases in this series, flaps reflected from the divided ends of the nerve were used to restore continuity; a method which is unscientific and futile. It is needless to state that there was no evidence of regeneration in either patient treated in this manner. Other methods suggested for overcoming a large defect in a nerve trunk, such as lateral implantation of the two ends of the divided nerve into the trunk of an adjacent intact nerve, or resection of bone in order to shorten the limb and thus to permit end to end suture of the nerve, were not employed in this series. There is considerable doubt about the efficacy of the former procedure and, in view of the results of nerve suture in general, it is probable that very few surgeons would advise the adoption of the latter method.

The operation of neurolysis was performed when the nerve trunk, though involved in scar, appeared to be intact. It consisted in dissecting the scar from the region of the nerve, which, if possible, was placed in a new position in a healthy inter-muscular plane. If this was not possible a pedicled flap of fatty tissue was used in the hope that fresh adhesion of the nerve to the scar would thereby be avoided. When it was found that the scar had invaded the trunk of the nerve, it was removed from it by dissection and the nerve fibres found divided were sutured without interfering with the intact *fasciculi*.

During convalescence, the paralysed muscles were kept in a position of rest by the use of papier mâché splints made to fit each patient (*see Plate B*). The splints were removed and the

limb was treated by the usual methods of physio-therapy every day—a procedure of great importance which, unhappily, was neglected in some cases after evacuation from Dartford with the distressing result that fibrous ankylosis occurred in the immobilised joints. In this connection it is also distressing to note that many patients arrived at the 3rd Australian Auxiliary Hospital without splints of any sort to prevent overstretching of the paralysed muscles. In some instances these had never been applied, and in others the splints had been removed prior to the transfer of the men in order to conserve the surgical stores at the hospital at which they had been treated.

As the problems presented to the surgeon and the prospects of success following operation bear a special relation to the particular nerve which has been wounded, it is obviously desirable to consider the end results in relation to each nerve rather than to describe the results of suture of peripheral nerves in general. The conditions found at operation and the end results following this treatment have therefore been classified under headings indicating the nerves involved, as follows:

(a) Upper Limb.

1. *Brachial plexus.* There were two cases of wounds of the brachial plexus, and in both there was great difficulty in tracing the nerve trunks through the scar tissue. Two cords of the plexus were found divided in each case and were united by end to end suture. There has been no appreciable regeneration in either patient, but in view of the fact that each of them had sustained an extensive wound, that there was an abundant formation of scar tissue, and that there was a severe injury to the nerves of the plexus, thus result is not surprising. In any event, the percentage of failures in wounds of the brachial plexus is high.

2. *Musculo-spiral nerve.* Nine patients in this series sustained lesions of this nerve, associated with paralysis of the extensor group of muscles, which exhibited a complete reaction of degeneration to electrical stimulation, and with the usual area of sensory loss (*see Plate C*). One case must be eliminated from consideration owing to the fact that a large gap in the nerve was repaired by the unscientific nerve flap method. Six patients sus-

tained an anatomical division of the nerve which was treated by end to end anastomosis. The result has been good in five of these, inasmuch as there has been a good return of voluntary power in all the extensor muscles, with disappearance of the drop wrist deformity, and a material improvement in the sensory loss.

It is probable that perfect neurological recovery after second-ary suture of a divided peripheral nerve is rarely, if ever, attained and that some impairment of the synergic action of muscles together with some persisting cutaneous sensory disturbance remains even in those patients who appear, at first sight, to exhibit highly satisfactory results following this operation. Despite this fact, it seems justifiable to describe as "good" a result which restores the patient to a condition of economic usefulness and which relieves the taxpayer of the duty of providing a pension at a rate greater than 16 per cent. of the maximum. As has been stated, five patients treated by end to end suture can be included in this category, although in two of these there is some limitation of wrist movement due to improper use of the "cock-up" splint. There was no evidence of regeneration in the sixth patient, who was treated by an operation for tendon transplantation two years after anastomosis of the nerve had been performed.

The remaining two patients did not sustain an anatomical division of the nerve and, in these, the operation of neurolysis was performed. The end results have been as good as, but not better than, those following successful end to end suture, indicating that the normal nerve pattern has not been restored despite the fact that the sheath of the nerve seemed to be intact at the time of operation. The results are summarised in the following table:

TABLE I MUSCULO-SPIRAL NERVE

Type of operation	Total number	Good result	Bad result
Union by nerve flap ..	1	—	1
End to end suture ..	6	5	1
Neurolysis	2	2	—

3. *Ulnar nerve.* Twenty-two patients were operated upon for lesions of the ulnar nerve, in three of whom there was also an

associated median nerve injury. The majority exhibited the typical deformity and sensory loss (*see Plates D1 and D2*) but, in some, the loss of sensation was more extensive than that commonly described, particularly on the dorsal aspect of the hand (*see Plate E*).

The defect in one case of extensive destruction of the nerve in the forearm was bridged by a nerve flap without success; there has been no evidence of regeneration in this patient and his pension has been stabilised at 50 per cent. In another patient exhibiting a similar injury, the gap in the nerve was bridged by a nerve graft and it is of interest to note that some regeneration has occurred and that his pension rate is 25 per cent. End to end suture of the ulnar nerve was performed in nine patients. In three of these there has been a return of motor function in all muscles supplied by the nerve below the lesion together with some return of all forms of sensation and it therefore seems justifiable to describe these results as "good" despite the fact that none are perfect. In three other patients similarly treated, there has been a good return of motor function but very little sensory regeneration, with the result that, though improved by operation, the usefulness of the hand for fine movements is far from normal. One of these three patients had sustained a large wound in the region of the internal condyle (*see Plate A2*) and the loss of nerve tissue was so great that it was necessary to adopt the manoeuvre of transposing the nerve to the front of the internal condyle in order to obtain apposition of its two ends.

There was no evidence of regeneration after suture in the remaining three patients in this group and, as no special difficulties were encountered at the operations, it seems probable that there was an inadequate removal of interstitial fibrous tissue from the nerve trunk at the time of operation. It must be remembered that it may be beyond the power of the surgeon to remove this tissue completely because it may extend for some distance up the trunk of the nerve, in which case it is obviously impossible to get above the area of the damage and, at the same time, succeed in approximating the divided ends. Another difficulty is that this upward extension may not be obvious on macroscopical inspection of the cross section of the nerve. An alternative explanation of these bad results is the development



PLATE A(1)

A Wound of the Lower Third of the Arm. The Median, Ulnar, and Internal Cutaneous Nerves were Divided

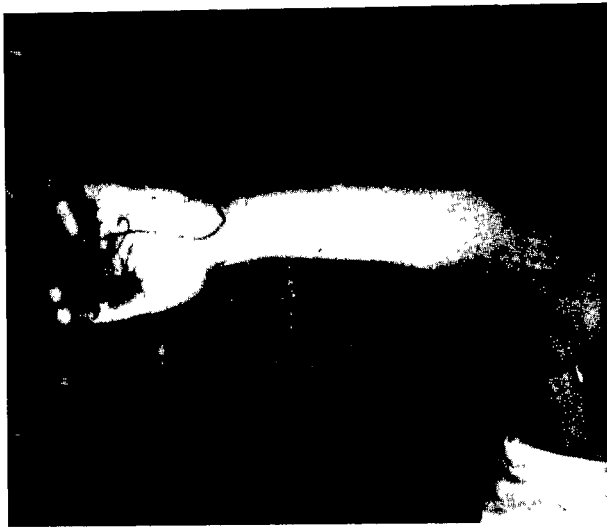


PLATE A(2)

A Wound of the Inner Side of the Elbow There was a Loss of two inches of the trunk of the Ulnar Nerve.

EXAMPLES OF LARGE SCARS WHICH MAY BE FOUND IN ASSOCIATION WITH WOUNDS OF THE PERIPHERAL NERVES



PLATE B

PAPIER MÂCHÉ SPLINT USED TO PLACE THE MUSCLES, PARALYSED BY
DIVISION OF THE ULNAR NERVE, IN A POSITION OF REST



PLATE C

TYPICAL SENSORY LOSS AFTER DIVISION OF THE
MUSCULO-SPIRAL NERVE BELOW THE ORIGIN OF ITS
EXTERNAL CUTANEOUS BRANCH

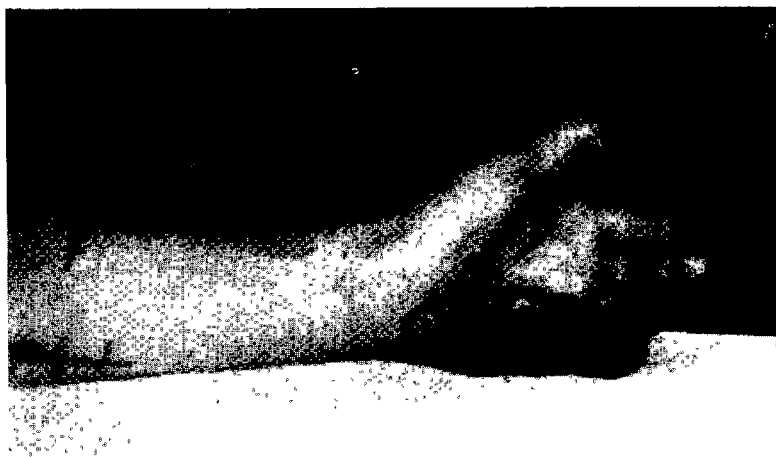


PLATE D(1)

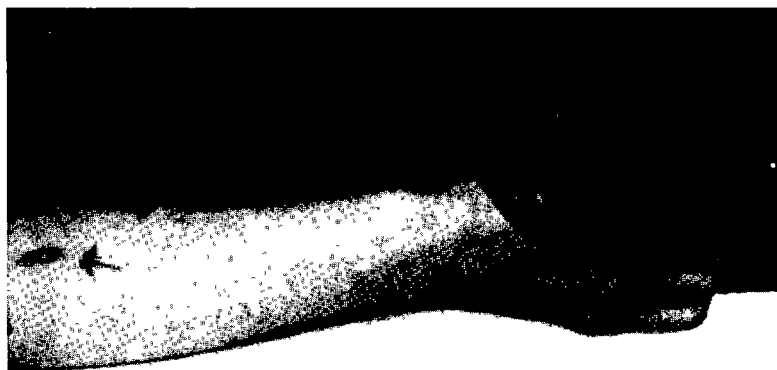


PLATE D(2)

TYPICAL SENSORY LOSS AFTER DIVISION OF THE ULNAR NERVE



PLATE E

SHOWING RADIAL EXTENSION OF SENSORY LOSS ON THE DORSUM OF THE HAND PRESENT IN SOME CASES OF DIVISION OF THE ULNAR NERVE

The outer line indicates the area of loss to light touch and the inner line that of loss to pain.



PLATE F

SHOWING THE IMPORTANT SENSORY SUPPLY OF THE MEDIAN NERVE TO THE SKIN OF THE HAND

Outer line—loss to light touch, inner line—loss to pin-prick Imperfect restoration of this sensory loss accounts for the “clumsy hand” found even in those cases of median nerve injury in which there has been good motor regeneration



PLATE G

AN UNTOUCHED PHOTOGRAPH TAKEN FORTY-EIGHT HOURS AFTER
DIVISION OF THE MEDIAN NERVE

Note the trophic changes in the area of cutaneous distribution of
this nerve in the left hand

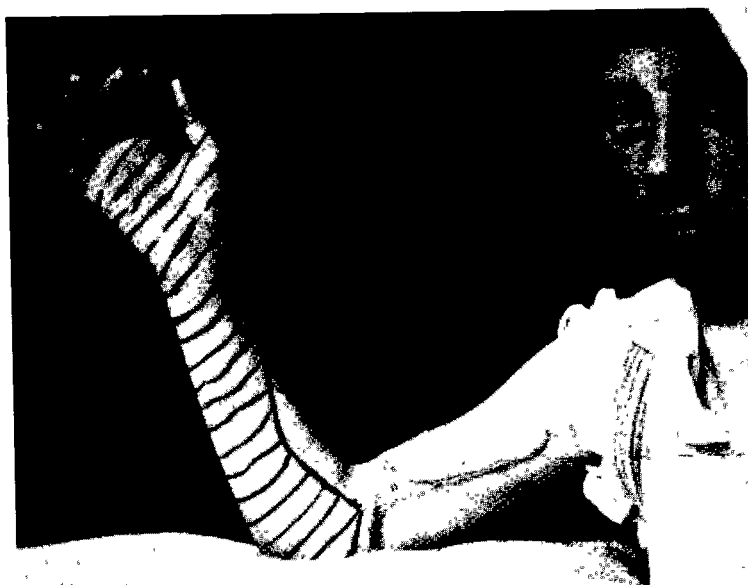


PLATE H

TYPICAL SENSORY LOSS FOLLOWING DIVISION OF THE MEDIAN,
ULNAR, AND INTERNAL CUTANEOUS NERVES



PLATE I(1)

AREA OF SENSORY LOSS FOLLOWING DIVISION OF THE MEDIAN, ULNAR, AND INTERNAL CUTANEOUS NERVES IN THE CASE OF SGT W.

Note that the palmar aspect of the thumb has escaped.



PLATE I(2)



PLATE I(1)

THE AREA OF SENSORY LOSS IN THE LEG AND FOOT FOLLOWING DIVISION OF THE SCIATIC NERVE



PLATE I(2)

Outer line—loss to cotton wool touch; inner line—loss to pin-prick

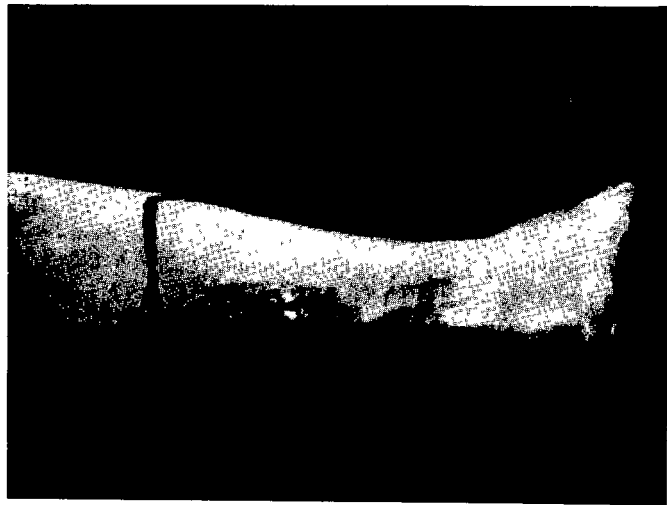


PLATE K(1)

TROPHIC LESIONS OBSERVED SEVENTY-TWO HOURS AFTER DIVISION OF THE SCIATIC NERVE

The toes were purple in colour, the terminal phalanx of the second toe being almost black.
Note ulcer on back of leg.

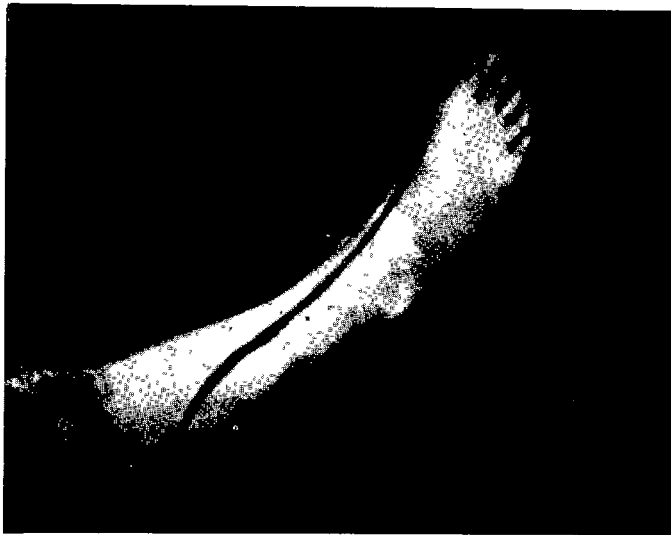


PLATE K(2)



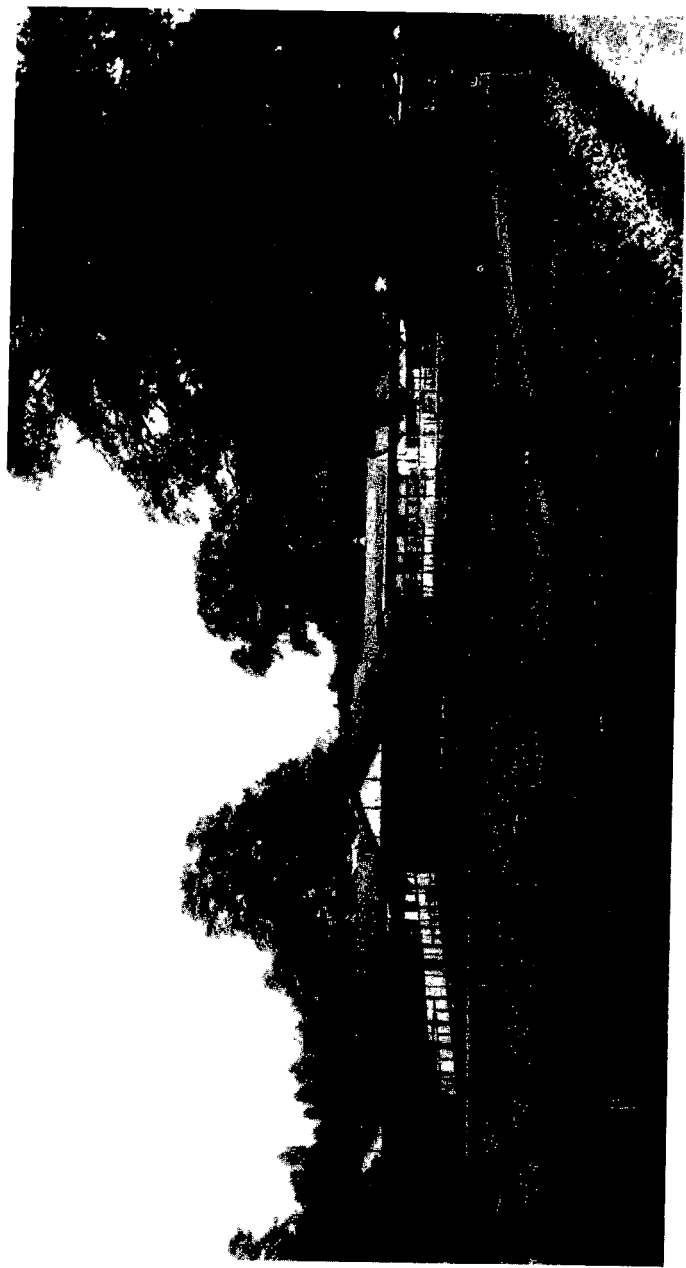
PLATE L

TYPICAL SPINDLE-SHAPED NEUROMA OF SCIATIC NERVE, LYING BETWEEN
TAPE SLING AND POINT OF DISSECTING FORCEPS



PLATE M

DIVISION OF ANTERIOR TIBIAL NERVE SHOWING AREA OF SENSORY LOSS AND
LIMITATION OF MOVEMENT OF THE TOES AS COMPARED WITH THE OTHER
FOOT



11. QUEEN'S HOSPITAL, SIDCUP, ENGLAND, FOR TREATMENT OF INJURIES TO THE FACE AND JAW

This hospital included an Australian "pavilion" (See article by Sir Henry Newland)

Lent by Sir Henry Newland



PLATE N(1)

FYF, BEFORE OPERATION



PLATE N(2)

FYF, AFTER OPERATION



PLATE O(1)

Before operation.



PLATE O(2)

After operation.

RHINOPLASTY AFTER HIGH NASAL LOSS, "BIRD-BEAK TYPE"

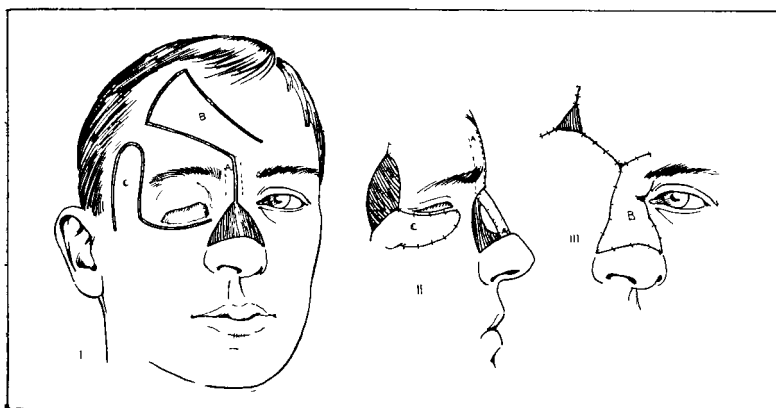


DIAGRAM 1

RHINOPLASTY AFTER HIGH NASAL LOSS, "BIRD-BEAK TYPE"



PLATE P(1)

Before operation.

Mid-Nasal Loss



PLATE P(2)

After operation

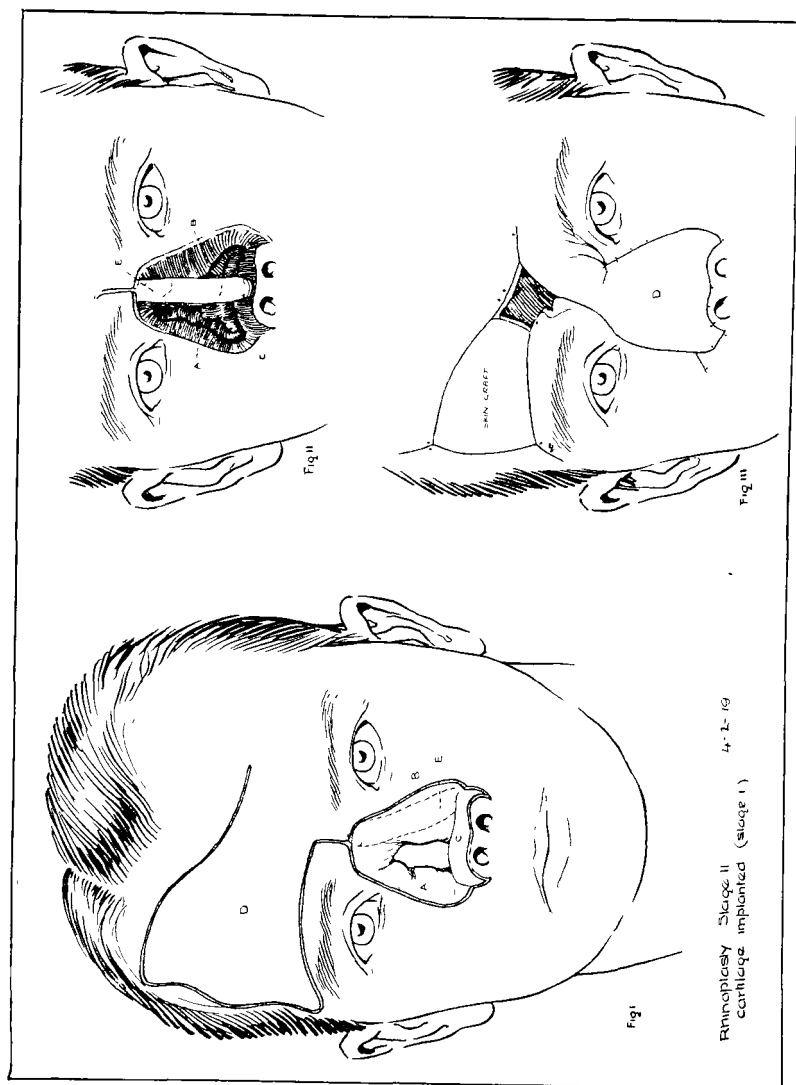


DIAGRAM 2

RHINOPLASTY AFTER MID-NASAL LOSS



PLATE Q (1)

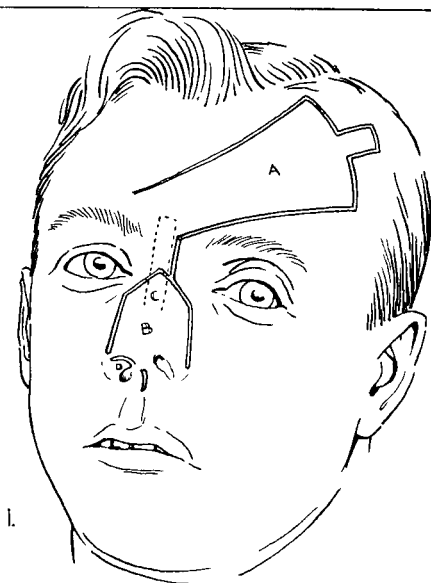
Before operation

LOW NASAL LOSS (INDIAN MUTILATION TYPE)



PLATE Q (2)

After operation.



I.

DIC II
Nose flap 'B'
turned down

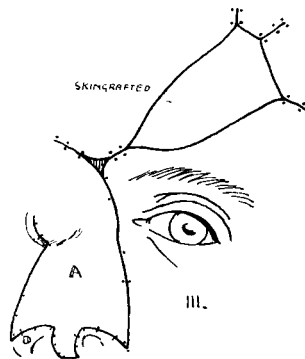


II.

Rhinoplasty to restore nose.
Cartilage implanted 4-4-18
Dics I II III operation 18-6-18
WV 28-6-18

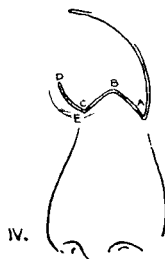
DIC I

- A- Frontal flap
- B- Flap cut from remaining skin of nose to form epithelial lining.
- C- Cartilage.
- D- Remains of alæ



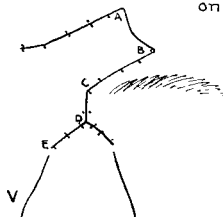
III.

DIC III
Frontal flap
lying in place
on nose



IV.

DIC IV
Pedicle divided

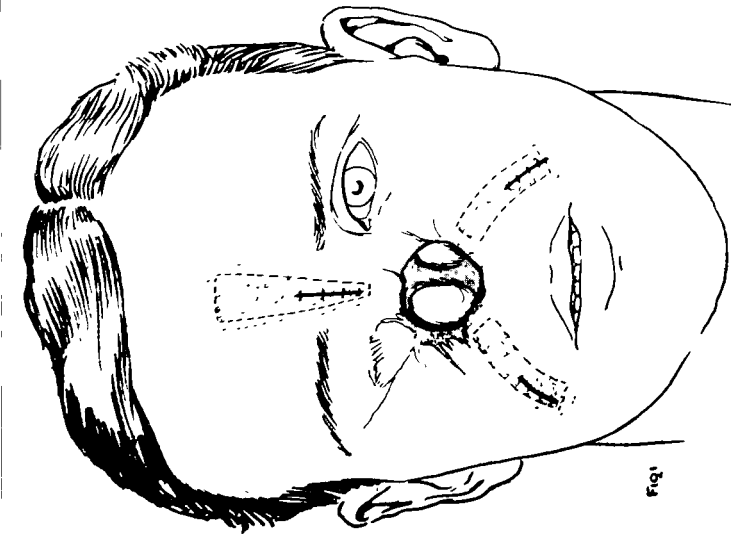


V.

DIC V
Pedicle returned to forehead

DIAGRAM 3

RHINOPLASTY AFTER LOW NASAL LOSS



Operation to implant cartilage 30-1-19 (Fig. 1)

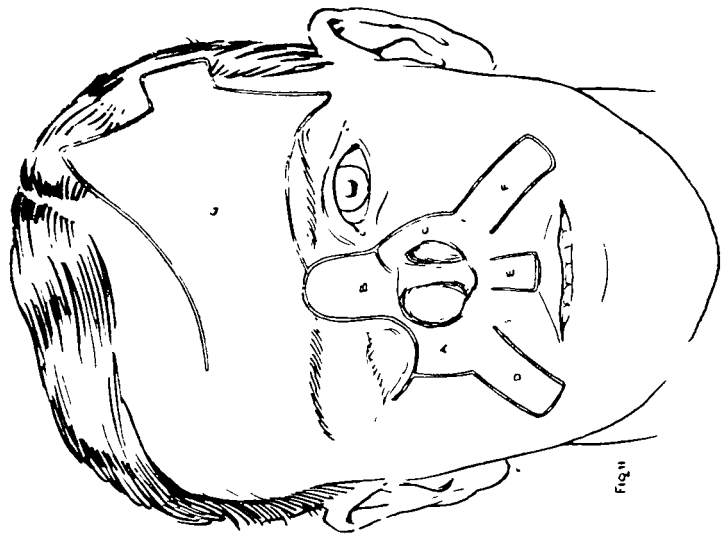


Fig. 11 Stage 11 Flaps outlined 18 3 19 stippled area cartilage

DIAGRAM 4
RHINOPLASTY AFTER TOTAL NASAL LOSS
Left Insertion of cartilage. *Right*: Incisions outlined.

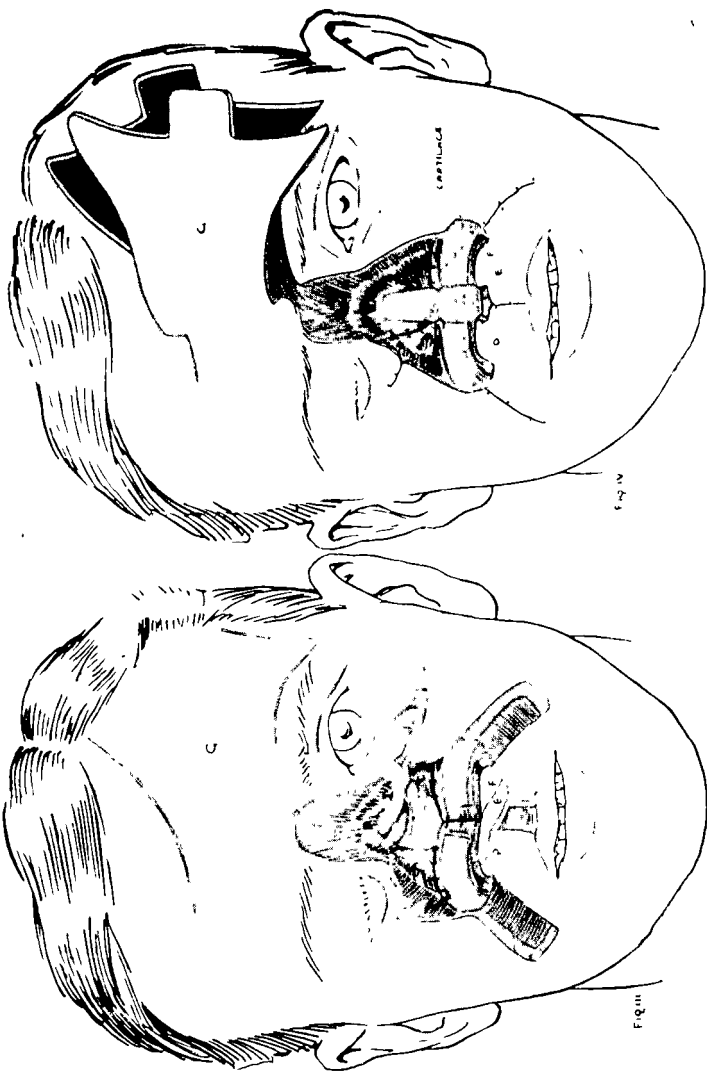
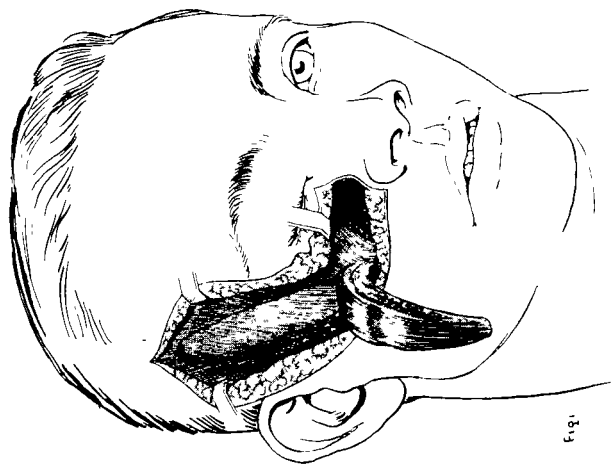


DIAGRAM 5
 RHINOPLASTY AFTER TOTAL NASAL LOSS
 Flaps raised to form a lining and framework. Forehead flaps outlined.



Utilisation of temporal muscle to form malai prominence and a bed for a cartilage graft

Re 10-18

Fig. 1 Temporal flap cut

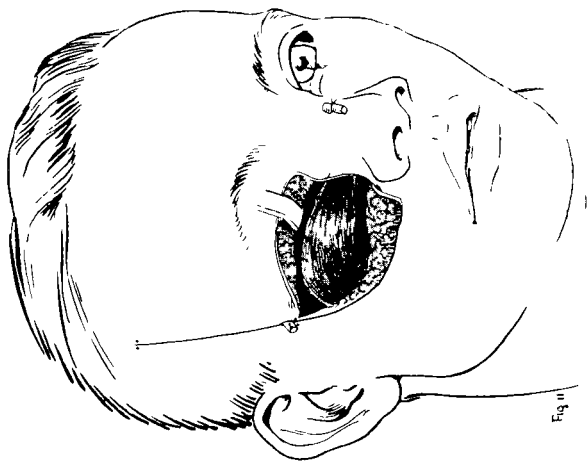


Fig. 11 Temporal muscle flap turned forward and sutured in place

DIAGRAM 6

USE OF TEMPORAL MUSCLE



PLATE R

RHINOPLASTY BY TUBED PEDICLE AND PECTORAL FLAP

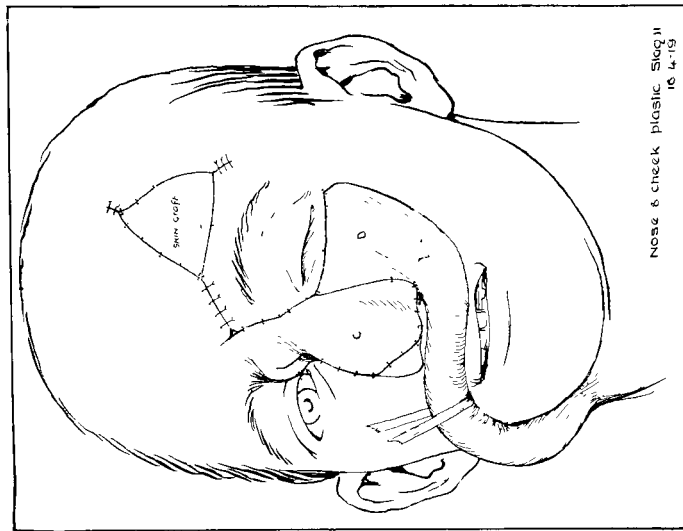


DIAGRAM 7



PLATE S(1)

Before operation

INJURY TO LIPS AND MANDIBLE



PLATE S(2)

After operation.



PLATE T(1)

Cap splints *in situ*.

INJURY TO LOWER LIP—FRACTURE OF LOWER JAW



PLATE T(2)

After operation

Operation 6 3 19

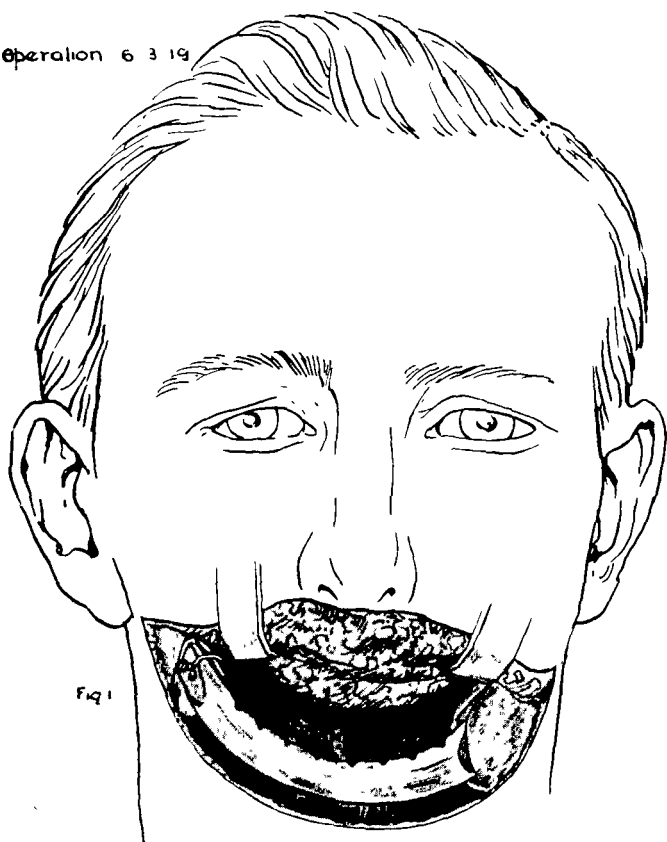


Fig 1

Fig 11



Fig 111



Figs 11. & 111. RIB cut & shaped

DIAGRAM 8

FRACTURE OF THE MANDIBLE
Illustrating a graft from the rib.

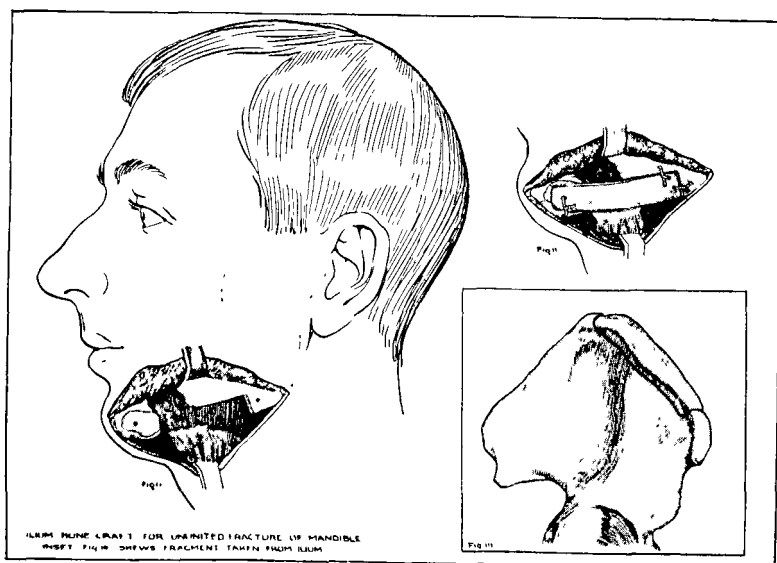


DIAGRAM 9

Graft from the iliac crest (the fragment taken is outlined).

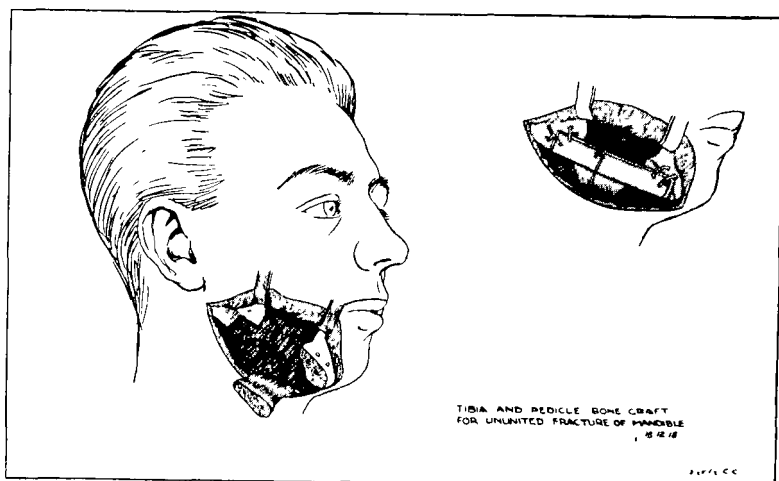


DIAGRAM 10

Graft from tibia with pedicle.

FRACTURES OF THE MANDIBLE

To face p 321

of cicatricial changes about the suture line perhaps associated with mild sepsis. Whatever may be its cause there is no doubt that interstitial fibrosis in the nerve trunk forms a significant barrier to regeneration.

Contrary to expectations expressed at the time of operation, the results in eleven patients treated by neurolysis have not been uniformly satisfactory. In this group, the nerve trunk passed uninterruptedly through the scar of the wound in every case and there seemed no reason to do more than separate it from adhesions and to take such steps as seemed appropriate to prevent these from reforming. The recovery in one patient has been almost complete, and, in five others, the results have been comparable to those following successful end to end suture; on the other hand, there was no evidence of regeneration in the remaining five patients following operation. The failure in these cases must be attributed to an interstitial fibrosis in the nerve trunk, which may develop despite the fact that the outer sheath of the nerve appears to be uninjured. One of these patients was operated upon by Lieut.-Colonel Poate eighteen months after the date of the performance of the neurolysis operation. As there had been no sign of regeneration in the ulnar nerve, he divided it, transposed it to the front of the elbow and performed an end to end anastomosis. Regeneration began at once and, though there is still some residual paralysis in this patient, the end result has been considerably improved by the second operation. It seems obvious that a similar course of action should be adopted in all patients treated initially by a neurolysis operation, in whom there is no evidence of regeneration after the lapse of twelve, or, at the most, eighteen months.

It is difficult to assess the results from the standpoint of economic usefulness in the case of the ulnar nerve because this must necessarily depend upon the occupation of the patient concerned. An intact ulnar nerve is almost a luxury to a manual labourer but is a vital necessity, for example, to a pianist or a surgeon. In the following table this aspect is neglected and the results are classified in accordance with the signs of regeneration which were found on neurological examination.

TABLE II ULNAR NERVE

Type of operation	Total number	Good result	Fair result	Bad result
Union by nerve flap	1	—	—	1
Union by nerve graft	1	—	1	—
End to end suture	9	3	3	3
Neurolysis	11	6	—	5*

* One patient improved by division and suture eighteen months later.

4. *Median nerve.* There were nine cases of injury to the median nerve, of which three were associated with ulnar nerve lesions. Four were treated by end to end suture and five by neurolysis. Good motor regeneration was noted in two of the former group and in all of the latter, but, from a functional point of view, the results were unsatisfactory because sensory recovery was incomplete and the resulting difficulty in co-ordinating finer movements seriously impaired the usefulness of the hand. These patients exhibit what has been termed "the helpless index finger" owing to the loss of that specialised sensation which is so important in the hand (*see Plate F*).

It is well known that severe pain is a common concomitant of injuries of this nerve, and that, in some cases, it may be very severe, in which case the term "causalgia" is applied to the condition. Two patients, who suffered from causalgia, were relieved by the operation of neurolysis; a fortunate result because it was not uncommon to find that nothing short of division of the nerve and end to end suture was effective in relieving this symptom. Another feature of lesions of the median nerve is the trophic change in the area of its cutaneous distribution. This development may be well marked within forty-eight hours of the time of infliction of the wound (*see Plate G*).

The true outlook for patients suffering from injuries of this and other peripheral nerves was not properly appreciated in 1920, when the first "follow-up" investigation of this series of cases was made. At that time any sign of regeneration was accepted as evidence of further favours to come, but the second "follow-up" has shown little improvement subsequently in the condition of any of the patients. The following brief description

of a case of division of the median, ulnar and internal cutaneous nerves will serve to illustrate this fact.

Sgt. W., 20th Battalion, aged 19 years.

The brachial artery and the median, ulnar and internal cutaneous nerves were severed by a through and through wound on the anterior aspect of the lower third of the right arm. There was no response to faradic stimulation in the muscles supplied by the nerves below the wound and the effective condenser discharge varied from 3 to 4 microfarads in the different affected muscles. The sensory loss was atypical inasmuch as portion of the skin over the palmar aspect of the thumb was not affected (*see Plates G and I 1 and 2*). Nerve suture was performed two months after the time of injury and only fourteen days after the wound through which the brachial artery had been ligated had healed. And end to end anastomosis of both median and ulnar nerves was performed, the latter nerve being transposed to the front of the elbow in order to permit of apposition of its ends. The loss of substance in the case of the internal cutaneous nerve was so great that no attempt was made to repair it.

Two years later, Major George Bell wrote as follows in response to a "follow-up" letter sent to the patient: "Sgt. W. has such a good hand that I was intending to write to you about it. To me the most striking feature is its excellent general appearance." Major Bell enclosed reports which showed that the patient could "make a good fist" but that his chief disability was "loss of feeling". There was normal voluntary movement in the wrist joint and hand with the exception that the patient was unable to flex the two distal phalanges of the index finger and could not adduct or abduct the middle and ring fingers. There was response to faradic excitation in all the muscles of the forearm and hand. The patient could appreciate, but could not localise, light touch in the area of sensory loss in the hand.

It was hoped, at that time, that eventually this might prove to be a really good result following suture of peripheral nerves, but, unhappily, there has been no further improvement and the man's pension has been stabilised at 35 per cent.

TABLE III MEDIAN NERVE

Type of operation	Total number	Good regeneration	Poor or bad regeneration
End to end suture ..	4	2	2
Neurolysis	5	5*	—

* Including two patients in whom causalgia was relieved by this operation.

The results following operative treatment of lesions of the median nerve are summarised in the above table, in which the cases are classified from the standpoint of evidence of regeneration rather than from that of economic usefulness of the hand. It has already been stated that "good regeneration" is

by no means synonymous with "good restoration of normal function" in the case of the median nerve, owing to the fact that the important paths for afferent stimuli from the hand are never re-established in the normal pattern.

(b) *Lower Limb.*

1. *Sciatic nerve.* The neurological and economic results in the case of this nerve have been consistently worse than those in any of the other peripheral nerves. There were fifteen cases of injury to the sciatic nerve, of which nine were treated by end to end suture and six by neurolysis. Two patients in the former group exhibited some evidence of regeneration in 1920, as shown by weak voluntary movement and a response to faradic excitation, in the muscles of the leg, but there has been no improvement since that time. The remaining seven patients treated by end to end suture have not exhibited definite signs of regeneration, although persistent and intractable trophic ulceration of the sole of the foot was present in only two of them, both of whom were treated by amputation below the level of the knee joint. The sensory distribution of the sciatic nerve embraces the greater part of the foot and the outer side of the leg (*see Plates J1 and 2*) and, as is the case with the median nerve, trophic lesions in the area of its sensory supply are common following sciatic nerve injuries. It is of interest to note that signs of disturbance of the trophic function of the nerve may be apparent soon after it has been divided (*see Plates K 1 and 2*) a point to which attention has already been directed in connection with median nerve injuries. In view of this important trophic function, it seems reasonable to infer that the five patients, treated by end to end suture, who were not troubled by persistent trophic ulceration of the foot, thereby exhibited some measure of regeneration of the nerve following operation.

Material improvement was noted in five of the six patients treated by neurolysis, but, in all of these, the end result falls far short of complete restoration of motor and sensory function. Two of these patients suffered from pain in the area of sensory distribution of the nerve, but this was not severe and disappeared after operation. One patient in this group was of special interest because, at operation, a large spindle-shaped neuroma was found in the nerve trunk (*see Plate L*). It was customary

to regard this neuroma as an indication for division and suture of the nerve trunk, but, in this case, as the sheath of the nerve seemed to be intact, and as there was some response in the leg muscles to faradic stimulation of the nerve above the neuroma, neurolysis was performed. It is pleasing to find that regeneration has taken place in this patient to a greater degree than in any of those treated by end to end suture. The results following operations on the sciatic nerve are indicated by the fact that the pension rates vary from 50 to 75 per cent. and may be summarised as follows :

TABLE IV SCIATIC NERVE

Type of operation	Number of cases	Fair regeneration	Poor or bad regeneration
End to end suture ..	9	—	9*
Neurolysis	6	5	1

* Amputation below the knee performed later in two cases

2. *Internal and external popliteal nerves.* One patient sustained a complete division of the internal popliteal nerve which was treated by end to end suture with the result that there has been some motor regeneration and restoration of sensation; there are no trophic ulcers on the sole of the foot, the patient walks well and his pension has been stabilised at 25 per cent.

End to end suture of the external popliteal nerve is frequently disappointing, though some surprisingly good results have been reported. The only patient in this series of cases who was treated in this manner fortunately can be included in the latter category. It is stated, in a recent report on his condition, that "there is good dorsiflexion at the ankle joint with only slight restriction of range and there has been some return of sensation. The result of suturing is really good and the incapacity is now assessed at 12½ per cent."

Two other patients who sustained injuries to the external popliteal nerve were treated by the operation of neurolysis. There has been only slight motor regeneration in each patient but, as is always the case, both patients can walk fairly well with the aid of a "drop-foot" apparatus.

3. *Other nerves in the lower limb.* No evidence of regenera-

tion followed end to end suture in one patient who suffered from complete division of the anterior tibial nerve in the lower third of the leg (*see Plate M*). Another patient sustained a lesion of the anterior crural nerve which was not complete and was treated by neurolysis with satisfactory results.

It would be both stupid and futile to gloat over the successes or to attempt to gloss over the failures revealed by an investigation, such as this, of the end results of any special type of wound sustained in the 1914-18 war; the sole value of any investigation of this kind must depend upon the lesson which can be learnt from defects, either in general medical administration or in special surgical treatment, which may be revealed. It is therefore desirable that all surgeons who review their work during that war should do so in a highly critical spirit, seeking for and emphasising every fault whether real or imaginary, in order that their successors in the present and future wars should be made aware of the pitfalls into which they fell.

When the results in this series of cases of wounds of the peripheral nerves are reviewed from this point of view, it is apparent that some of the failures are attributable to faulty surgical technique. In two cases in which there was complete division of the nerve trunk, a bad result was inevitable because the gap in the nerve was bridged by a flap reflected from one of the divided ends, but, in others in which no regeneration took place after approximation of the severed nerve by stitches, it is impossible to escape the conclusion that incomplete removal of scar from the nerve trunk, or inefficient suturing, may have been responsible for the lack of success. Then again, in the series of cases treated by neurolysis, poor results were distressingly frequent owing, in some instances, to lack of appreciation of the extent of the damage to the nerve trunk and, in others, to ignorance of the important part played by an area of interstitial neuritis in preventing regeneration. Some of these errors are attributable to my inexperience. The surgery of wounds of the peripheral nerves is often difficult but at the stage when I felt that I was gaining some insight into it, I was—very properly, owing to the exigencies of the service—transferred to France, and saw it no more. There seems little doubt that better results

**General
review**

would be obtained if men who sustain similar wounds in future wars were treated in special hospitals by surgeons specially selected for this work. This policy was adopted by the Americans in the 1914-18 war and is, of course, merely an extension of the principle of specialisation which was found so valuable in every army in relation to other types of wounds.

Some of these errors might have been avoided had there been an extension of the system of supervision by consulting surgeons, so successful in France, to the Australian Auxiliary Hospitals in England, because an efficient consultant would have made available the results of the general experience gained in all hospitals in which these cases were treated.

Another drawback to the efficient treatment of Australian wounded soldiers was concerned with medical administration. All the men included in this series of cases had been sent from France to various British hospitals, collected from these and transferred to the Auxiliary Hospital, operated upon there and then transferred to various hospitals in Australia. There were constant "breaks of gauge" which necessarily caused interruptions in treatment. Attention has already been directed to the fact that, in the early stages of these peregrinations, splints were not always employed to prevent overstretching of paralysed muscles, whereas, in the later stages, splints were sometimes left on too long, with disastrous results to joint movement. It is also obvious, from the records of these cases, that there was poor co-ordination between the various hospitals in regard to passing on details of treatment. It followed that medical officers in Australia were often left in ignorance concerning the type of operation which had been performed in England. It would have been better, particularly in the case of men treated by neurolysis, if instructions had been sent to Australia suggesting that, if no regeneration was apparent in twelve months from the time of operation in England, the nerve should be divided and sutured.

This difficulty will always arise when troops are sent from Australia to fight on the other side of the world. It was recognised towards the end of the war, when orders were issued that details of treatment must accompany each patient; but special care will be necessary, in future similar conflicts, to achieve adequate co-operation from the outset.

These are the chief defects which emerge from a study of this series of cases. It may be that they have been over-emphasised because the end results do not differ materially from those reported by other observers; but, if so, this is a fault in the right direction inasmuch as it may lead to improvement in the future in the percentage of cases exhibiting satisfactory regeneration after surgical treatment of wounds of the peripheral nerves.

III

WORK OF THE AUSTRALIAN FACIO-MAXILLARY SECTION OF THE QUEEN MARY HOSPITAL, SIDCUP, ENGLAND 1917-19

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(With diagrams by Lieutenant Daryl Lindsay)

In 1917 an Australian facio-maxillary unit was formed and attached to the Queen Mary Hospital for the treatment of war injuries to the face and jaw. The hospital, a hutted one, was situated at Sidcup, Kent, in the grounds of Frognaal, once a country seat of the first Viscount Sydney, after whom the capital of New South Wales was named. The advent of the Australian unit revived therefore an historic association.

The Queen Mary Hospital was unique among the military hospitals of the Great War in that it was imperial in character. Solely British at first, it was subsequently expanded by attaching Canadian, Australian, and New Zealand units. Each dominion section was under the command of its surgical specialist. The efficient organisation of the British section served as a model for the others. For disciplinary purposes and general administration the hospital was under the command of Colonel Colvin, a British officer. The personnel, surgical, dental and nursing, of the Australian section and its equipment assured its capacity, after a period of observation of the work of the British section, to undertake all types of plastic repair of the face and jaws. The work carried out was carefully recorded, and was illustrated by the photographic department of the hospital and

by the Australian section's own artist.⁸ All X-ray examinations and electrical treatment were carried out by the hospital department at the service of all sections. Sir Arbuthnot Lane was Consulting Surgeon to the hospital and Sir Frank Colyer, Consulting Dental Surgeon.

Joint meetings of the officers of all the sections were held from time to time. These served to distribute knowledge and to promote friendly rivalry in making a trial of new operative procedures and their technique. After the entry of the United States into the war, the attendance of American surgeons for educational purposes gave the hospital a temporary international tint.

A very large number of wounds of the face and jaws occurred during the war. While the steel helmet was effective in protecting the skull and its contents it often failed to shield the face. Most of such wounds were due to shell and other fragments. The bullet ranked next in frequency. The aeroplane crash occasionally caused a "crush" fracture, of varying extent, of the face and jaws. Burns of the face, owing to its exclusion from the protection of the airman's head dress, were also met with.

The mortality of wounds of the face and jaws was greatly influenced by the course taken by the missile. If it traversed the face in an antero-posterior direction the wound was likely to be fatal owing to concomitant injury to the great vessels, brain or spinal cord. If on the other hand the missile pursued a side to side course the mutilation, though frequently great, was not nearly so apt to be lethal. A clearer conception of war wounds is obtained if the face be regarded in a broad sense as consisting of a framework of bone and cartilage with an external covering of skin and an internal lining of mucous membrane. When the case is first seen a careful examination should determine the extent of the loss of the bony and cartilaginous framework and of skin and mucous membrane.

It is convenient to consider the damage wrought by a missile travelling more or less transversely at successive horizontal levels from the supraciliary ridges above to the chin below.

1. Destruction of an eye with more or less loss of one or both

⁸ Lieut Daryl Lindsay His drawings and paintings, part of the Australian War Memorial Collection, have been lent for educational purposes to the medical schools of Australia.

eyelids (see *Plates N 1 and 2*). This was often associated with some orbital loss of bone. Infection of the lachrymal sac was often a troublesome complication.

2. (a) *High nasal loss*. This was often combined with the loss of an eye: the "bird-beak" type of Gillies. (See *Plates O 1 and 2*, and *Diagram 1*).

(b) *Mid nasal loss*. This was often associated with loss of the adjoining tissues of the cheek and opening of the antrum. The lobule and alae of the nose are drawn up by contraction of the scar thus giving rise to the "pug nosed" type of Gillies (see *Plates P 1 and 2* and *Diagram 2*).

(c) *Low nasal loss*. This involved the lobule, alae, columella and part of the nasal septum. In addition there was in some cases involvement of the cheek, maxillae, and upper lip. The more restricted loss resembled that met with in the "Indian" mutilation (see *Plates Q 1 and 2* and *Diagram 3*).

(d) *Total nasal loss*. (See *Diagrams 4 and 5*.) This was often complicated by opening and infection of one or both antra and infection of one or both lachrymal sacs.

3. *Oral loss*. Here the type of wound depended on whether the maxillary or mandibular frameworks suffered loss. If they escaped, the loss of labial tissue was partial. If the anterior part of the maxillary arch was carried away, most of the upper lip was lost too. The effect on the lower lip was similar if the mandible suffered loss anteriorly. In the severest injuries the loss of the mandible extended from angle to angle. Sometimes the lower lip and the soft tissues of the chin and adjoining cheek were all destroyed. In such cases the mucous membrane of the floor of the mouth became continuous with the skin on the anterior aspect of the neck; a shocking deformity.

Treatment. The reparative surgery of wounds of the face and jaws is influenced for good or all by the early treatment given in the field ambulance and casualty clearing station where attention should be directed to—

1. The prevention of asphyxia as the result of

(a) The tongue falling backwards when there is gross mandibular loss.

(b) Blood entering the air passages. The sitting or prone position is therefore indicated.

2. The control of haemorrhage and the treatment of any consequent anaemia.

3. The treatment of shock.

4. The decontamination of the wound by mechanical cleansing and *débridement*. Owing to the rich blood supply of the face and to the freedom with which discharges are able to escape, excision of the wound should be omitted or done sparingly and of the skin not at all.

5. Primary suture of the wound. Normal tissues should be drawn into their normal position. Distortion and tension should be avoided. When tissue loss prevents normal apposition any raw surface, including bone should be given if possible an epithelial covering.

6. The application of simple splints, wire, Angle's bands, etc., to correct displacement in mandibular fractures, to give rest and to relieve pain.

Intermediate treatment: the stage of septic complications. While wounds of the face and jaws in many instances pursued an aseptic course, septic complications were common and frequently delayed for many months the operation the surgeon had in view. Inadequate drainage of septic wounds, fragments of bone, a peccant tooth, infections of the maxillary and frontal sinuses and lachrymal sac were all factors in causing irritating delay.

Where an aseptic operation on the jaws such as a bone graft was contemplated, it was the rule to wait until six months had elapsed since the last evidence of sepsis.

The usual principles of oral hygiene which obtain in civil practice should be followed. It is essential to employ every effective method to cope with oral sepsis with its proclivity to delay treating and to cause pulmonary infection.

Reparative treatment. The tissues having reached a condition of asepsis a final estimate was made of the loss of skin, framework and mucous membrane. The operation or operations necessary for their repair were planned in consultation with the dental surgeon, more especially when the jaws were involved.

Skin grafting. To make good the loss of skin and mucous membrane skin grafting was employed when other plastic pro-

cedures were not applicable. It was often used in combination with them. Skin, subcutaneous fat and fascia are always best replaced by similar tissues if possible. In many cases if the structures in the immediate neighbourhood were not available, a flap with a pedicle was used. The procedure of *tubing the pedicle of a flap* was designed by Major Gillies. It has made it possible to transport a flap from one part of the body to any other part. When it was very undesirable to add to the number of scars on the face by cutting a flap, grafts of the whole thickness of the skin were employed, especially in rhinoplasty to fill the gap in the forehead. These grafts were usually taken from the arm or pectoral region. Thiersch grafts were not much used where they were likely to be visible, for in appearance they differ much from natural skin. Used as an epithelial inlay on a Stent mould in the treatment of certain deformities of the eyelids, the Thiersch graft was valuable. It was however of the greatest value in replacing mucous membrane in many situations. In injuries involving the jaws it frequently happened that the fornices between the jaws and the cheeks or lips were reduced in depth or obliterated by scarring at some part of their extent. Free division of the adhesion, excision of the scar tissue, and the insertion of a Thiersch graft in a mould of the reconstituted fornix, made possible the fitting of a denture. The mould was fixed on a perforated metal plate which was screwed to a metal cap cemented on to the teeth. As in the case of the eye socket, it was necessary to wear a mould constantly for three months to prevent contraction.

Injuries to the eye and orbit. Deficiencies in the orbital margin were made good by the insertion of a bone or cartilage graft. Cartilage grafts while restoring form to a feature have the disadvantage of failing to acquire firm fixation in their bed. To correct the flattening due to depressed malar bone and lower orbital margin, the anterior half of the temporal muscle was sometimes employed (*see Diagram 6*). It was freed from its origin and swung forwards into a bed prepared for it by undercutting the skin. When the eyeball was lost, the fitting of an artificial eye depended on the socket being adequate to receive it, and on the eyelids being intact enough to retain it in position. If the conjunctiva which remained was insufficient to form a socket, a Thiersch graft was inserted on a spherical Stent

mould after the contracted socket had been prepared for its reception. At the end of a week the mould was removed and replaced by a mould of hard denture material which, except for cleansing, was retained continuously for three months. A socket formed in this way is subject to a muco-purulent discharge and an unpleasant smell like that of sebum. Loss of an eyelid was difficult to repair owing to its thinness. A notch in the margin not uncommonly persisted after operations on the lid and made the wearing of an eye shade preferable. If the skin only of the lid was concerned in the loss, a flap of skin from the neighbourhood was employed with success (*see Plates N 1 and N 2*).

Repair of injuries of the nose: rhinoplasty. The depressed fractures of the nasal bones which were observed were of some standing and not usually amenable to correction by refracture. The contour of the saddle shaped nose was corrected by the insertion, through a transverse incision in the region of the glabella, of a properly fashioned rib cartilage graft into a bed prepared by under cutting. The small transverse incision was sutured and pressure applied by a Stent mould to prevent the formation of a haematoma. Rhinoplasty for extensive or total loss of the nose was a much more complicated procedure. The destruction of the framework, the skin covering, and the mucous membrane lining necessitated their replacement, often a difficult problem. To provide a lining, which is so essential if shrinking of the skin covering is to be prevented, flaps of skin hinged on the edge of the hiatus were turned in and sutured with fine cat-gut. The framework was obtained by the insertion, a few weeks earlier, of cartilage grafts beneath the prospective hinged skin flaps (*see Diagrams 4 and 5*). Sometimes the main cartilage graft was inserted under the forehead skin intended to form the covering of the new nose, and was later on brought down with the flap. A frontal flap shaped to the desired pattern, and with a pedicle attached to the glabellar or temporal regions of the forehead made by far the best covering. Skin transported from the chest by means of a long tubed pedicle (*see Plate R, Diagram 7*) does not look well. A patient on whom the standard (or Indian) operation gave a good result, had previously been operated on in Australia by the Tagliocotian method in which the skin over the biceps is used as a covering. He stated that he had never endured such agony as that produced by the fixation

of the forearm to the head, a necessity in the technique. The raw surface left on the forehead, after the translation of the covering flap, was repaired by suturing in place a whole-thickness skin graft. The pedicle was divided two to three weeks later.

Injuries to the maxilla and cheek. Flattening of the contour of the cheeks due to depressed bone or to loss of the soft parts was treated by bone, cartilage, or fat grafts. Success with the fat graft was very uncertain owing to its tendency to shrink. The use of temporal muscle has been mentioned (*see Diagram 6*).

Fractures of the alveolar and palatal processes fell to the dental surgeon to treat unless the gap in the palate was amenable to surgical closure. When the maxillary loss was supra-alveolar the antrum and nasal cavities were often exposed. If intra-nasal drainage was assured, the skin flaps hinged on the edge of the antral or nasal hiatus were turned in to form a lining, and a flap was brought down from the forehead to complete the closure.

Aeroplane crashes were prone to cause a crush fracture, the face being stove in and the maxillae driven downwards and backwards. The unsightly flattening of the nose, cheeks and upper lip in one such case was remedied to a considerable extent by the adoption of the following method devised by Major Gillies. An intra-oral incision is made between the upper lip, cheeks and nose and the flattened underlying bone. It is deepened and all the attachments are divided until the soft parts can be freely lifted off the bone. A mould of the cavity calculated to restore the facial contour as far as possible is made, and is used as a vehicle for the insertion of Thiersch grafts to line the cavity. A prosthesis is made later on to support the features.

In the treatment of fractures of the maxilla the master word is "approximation" of the fragments; in fractures of the mandible, "occlusion" of the teeth.

Injuries of the lips (see Plates S and T). The framework which supports the lips in their natural position in the profile of the face is retro-labial. Loss of the anterior part of the maxillary or mandibular framework is generally associated with considerable loss of the corresponding lip. In the case of the maxilla the missing bone was made good by a denture of proper form.

The mandibular loss was repaired by a bone graft. The reconstruction of the lips themselves involves the provision of a lining and a covering. Usually the thickness of the flaps used in the plastic work makes up in bulk for the loss of the labial muscles. When available, mucous membrane was used as a lining. In its absence skin flaps were turned in hinge wise. A flap of skin with its long axis corresponding to the naso-labial groove was most often used to complete the lower lip. The cutaneous loss of the upper lip was repaired by a flap from the skin of the lower lip and chin. In each case the flap, if deemed necessary, was made to include mucous membrane and the intervening tissues. When it was impossible or undesirable to employ adjoining skin, the forehead or chest was used as the source. If the loss of the lower lip was combined with extensive loss of the soft parts of the chin, a visor like flap from the forehead, with a blood supply from the anterior branches of the temporal arteries, gave a good covering. A pectoral flap with tubed cervical pedicles was an alternative.

Injuries to the cheek. Loss of the tissues of the cheek in the vicinity of the nose was usually dealt with by enlarging the frontal rhinoplastic flap to the requisite extent. A mere lateral loss was repaired by using a forehead flap based on the anterior branch of the temporal artery or by bringing skin by means of a pedicle from the neck or chest. A whole-thickness skin graft was used at times.

Fractures of the mandible. The guiding principle in the treatment of fractures of the mandible is to place the fragments in the position they would occupy in correct occlusion of the teeth, any loss of bone being subsequently made good by a bone graft. The necessity for effective mastication is the basis of this principle.

When the fracture was unilateral with little or no loss of bone, and teeth were present on each side of the fracture, a single metal cap splint was employed.

It was the usual practice to extract any tooth or fragments of teeth in the line of the fracture and in the immediate vicinity of the fracture. This was especially important in fractures attended by loss of bone and requiring a bone graft (*see Diagrams 8 and 9*) later on.

When the fracture was unilateral with loss of bone, or was bilateral with or without osseous loss, and teeth were present in each fragment and in the maxilla, a double cap splint was applied. If the maxilla lacked teeth, the upper cap splint was necessarily omitted. A submental splint was then sometimes attached to the cap splint on the mandible to give better fixation. When loss of bone occurred at the angle, union of the fragments was sometimes secured by removing the upper molar teeth on the same side. This permitted the external pterygoid muscle to draw the posterior fragment upwards and forwards into contact with the anterior.

Fractures of the vertical ramus were splinted in occlusion. Splinting in the "open bite" position was not practised, as the experience in the British section proved it to have no advantage over the "closed bite" position. Indeed, even with the "closed bite" method, correct occlusion was not always the end result.

Rigid fixation was the aim in the earlier period of treatment of fractures of the mandible. After a time, which depended on the nature of the case, the fixation screws or pins were removed and movements of the mandible were encouraged. If union failed, and the fracture needed wiring or a bone graft, movement prior to the operation was also encouraged in order to obviate atrophy of the fragments. Shortly before the bone graft operation, the splints were strengthened, if necessary, and firmly cemented to the teeth. It was important that the fixation of the graft to the mandibular fragments should not be nullified by the incomplete fixation of the cap splints.

At first it was the practice to take the graft from the shaft of the tibia. Such a graft was brittle and not easy to trim to shape. Later on, the crest of the ilium was invariably employed. In one case, in which a tibial graft was used, it fractured when being removed; and in the course of preparing a bed for it the mucosa of the mouth was torn. Notwithstanding these incidents complete union of the graft and fracture resulted. In a case in which the loss of bone was complete, from angle to angle, except for a small fragment in the region of the chin, a long length of the eighth rib (*see Diagram 8*) was used as the graft. Parallel saw cuts in the concave inner surface of the rib enabled the bone to be bent to the correct curvature of the jaw.

In a few cases a pedicle (*see Diagram 10*) bone graft was used, either alone or in conjunction with a tibial graft, with a view to hastening the union of the fracture. A pedicle graft consists of a length of bone (1 to 1½ inch) taken from the anterior fragment and maintaining its connection with the infra mandibular muscles attached to it. The graft is wired to the mandibular fragments and is attached in any way thought suitable when used in association with a tibial (*see Diagram 10*) or iliac graft.

Bone grafting of mandibular fractures proved to be most successful. In 30 out of 38 cases sound union was obtained without any complication. In most of the remainder union ultimately took place in spite of mild sepsis and partial necrosis of the graft.

The incision in the operation is made in the groove above and behind the angle of the jaw and curves forward under the jaw to the end below the symphysis. The ends of the bones are exposed and the soft tissues stripped from their deep and superficial surfaces. The sclerosed bone is removed, and the ends of the fragments are drilled and shaped for the reception of the graft. A graft of the required length and shape is taken from the crest of the ilium (*see Diagram 9*) drilled, and wired in position.

Sound union of the graft generally occurred within three months.

IV

AMPUTATIONS AND ARTIFICIAL REPLACEMENTS LESSONS FROM THE WAR OF 1914-18

*By Colonel Wilfred Vickers, D.S.O., V.D.; M.B., Ch.M.,
F.R.A.C.S.*

The surgery of amputation stumps has been profoundly influenced by the work of the artificial limb maker, who, in turn, has responded to the demands of the surgeon for a replacement that will, as far as possible, carry on the function of the lost limb.

With the lower limb he has had much more success than with the upper. With the latter the problem of the hand has not yet been solved; even the efforts made during and after the last war did not produce anything that can be considered as a useful

mechanical hand. Yet the attempt to do so began as early as 1509, when an artificial metal arm with articulated fingers was made for Gotz von Berlichingen—in operating it the fingers had to be placed in position by the other hand. Ambroise Paré in 1564, describes prosthesis for both arm and leg. Until the Napoleonic Wars arm replacements mainly consisted of a leather bucket and hook fastened to the body by straps. At that time the trunk and shoulder girdle muscles were first used as sources of power to flex and extend the artificial fingers.

**The upper
limb**

Many attempts have been made by instrument makers to perfect a mechanical hand on this principle, and a number have been produced which, being worked by straps, enabled the wearer to open and close the fingers. Much was expected from these contrivances, and every Australian soldier with an arm amputation was supplied with one, if he asked for it. Yet it must be admitted that very few have been able to use them to advantage.

But though a satisfactory mechanical hand has not been produced, artificial arms have proved of immense value for various types of work. They have been made with a terminal socket into which can be fitted various devices allowing the wearers to carry out many types of work, and in many instances return to their previous occupations.

In other cases the amputees have so trained the remaining arm that they have been able to do amazing things—instances are given in *Chapter XVI*. Indeed in almost all instances more reliance is placed on the use of the sound limbs than on any replacement. The following War Office letter is significant :

“In view of the fact that an artificial hand cannot possibly replace the function of the natural hand, no matter how incomplete and restricted its movements may be, I am directed to request that you will be good enough to impress upon all concerned in your command, the importance of avoiding amputation of the arm or forearm whenever possible.

“In future no amputation of the arm or forearm will be performed except after consultation with one or more surgical experts.”

The function of amputation stumps in the upper extremity is almost entirely confined to leverage. No superincumbent weight

has to be borne. From the surgical point of view the fitting of a prosthesis for the upper limb demands that the amputation be done a couple of inches above the wrist or elbow, so that the bucket will fit the stump snugly.

In the case of arm stumps a procedure called "Cinematisation" has been tried. This is an attempt to make a skin-lined opening in a muscle or tendon, or to isolate a tendon and enclose this with skin. To either of these a loop is attached so that when these muscles act a direct pull on the prosthesis is obtained. It was thought that this would be particularly useful in arm stumps, but the results have been disappointing.

Many other ingenious operations, such as the grafting of a big toe for a lost thumb, and the conversion of metacarpals into fingers by phalangisation of the metacarpals, have been attempted by various surgeons, but none of them have been very successful; and the same must be said of the method of making false joints in the radius and ulna—so as to imitate a carpus which could move an artificial hand, and even by its action open and close artificial fingers.

The problem of the leg is different. The progress from the day of the peg leg to the present day lower limb with its knee joint and flexible foot has been very great. Peg legs attached to the body by wooden or leather sockets have been made and worn since remote times, but in the middle of the nineteenth century a limb maker named Potts invented a limb that permitted of flexion and extension of the knee and ankle joints. The task of the limb maker was often made difficult by the shape of the stump. At that time surgeons attempted to save as much of the limb as possible, with the result that numerous kinds of amputation of the lower limb were practised. Faraboeuf's *Manuel Opératoire* devotes 466 pages to the subject.

But the surgery of amputations has been changed by the evolution of the prosthesis, so that now normally only four amputations of the lower limb are described, *i.e.* those providing for (i) disarticulation at the hip joint; (ii) a nine-inch thigh stump; (iii) a seven-inch leg stump, and (iv) the Syme amputation. The last named is the only method that allows all the weight to bear on the end of the stump. Very few of the other amputations have any place in surgery to-day. In the case of

**The lower
limb**

the thigh stump, the weight is borne on the *tuber ischii*; in the case of the leg stump on the tuberosities of the tibia, partly assisted by a leather socket around the thighs. Some patients are able to take some weight on the end of the stump, thus relieving the weight taken by the bucket.

In the peg leg days the patient with a short stump below the knee used to flex the knee and take the weight on the front of it, as if he were kneeling. With amputations in the thigh, the higher the amputation the less stable the limb, and if the patient has a painful stump he cannot wear the peg leg. As the prosthesis developed and the surgeon and instrument maker collaborated more completely, the bucket was made to fit snugly around the upper part of the tibia or under the *tuber ischii*, and so demanded less and less end-bearing. The surgeon also was able to plan his incisions so that the bucket could act more efficiently, and the instrument maker could fashion the bucket so as to avoid pressing on any painful scar. Further improvements were made, the chief effect of them being to render possible greater efficiency of the knee joint in above knee amputations, with the result that the patient could with safety walk at a normal rate.

Much controversy occurred as to the material of which the buckets should be made. Wood, leather and duralamin have been extensively used. In fitting a below the knee stump the older method was to rely on a stiff thigh corset of leather, carried high up, rather than to depend upon the accurate fitting of the socket below the knee—all the weight was carried on the thigh and ischium, and the stump merely served as a lever to flex and extend the prosthesis. Later, the bucket was fitted as accurately as possible under the tuberosities of the tibia, and this became the primary method of support, the thigh corset being secondary. The top of the bucket impinges upon the *ligamentum patellae* just below the patella. In Australian limb factories this bucket, for both leg and thigh stumps, is now practically always made of wood. Wood has stood the test of time for general efficiency, and it is possible to fit it accurately to the stump, while adjustments are easily made if the shape of the stump should alter. The most important factor is good fitting; lightness is only a secondary consideration as a light limb will feel heavy if it is ill-fitting.

At the beginning of the last war re-amputations were done

soon after the original operation, with the result that in many cases considerable extension of the suppuration occurred, necessitating further removal of bone at a later stage. The practice of never performing any secondary operation on an amputation stump until all the oedema had disappeared resulted in great improvement, fewer operations being necessary and better stumps being formed.

In order to allow patients to walk without crutches and educate the muscles that are of value, provisional prostheses of various kinds are made, and are worn while the stumps are contracting down to the proper shape. These are made of plaster of Paris, gypsum or wood, and for the lower limb are often little more than a peg leg. They are cheap and can be replaced as soon as the stump begins to shrink. In this way the time during which amputees need rely on crutches is in many cases much reduced.

Re-education of the maimed is best done by making the patient carry out work for which he sees some result, rather than by repeating dull and uninteresting movements with a machine. The best way to re-educate a limb is to make the patient wear a replacement and use it, if possible, in the work to which he is accustomed. Wherever possible the disabled man should be retained in his old trade; it was found at Roehampton that 40 per cent. of the amputees returned to their old employment.

The French authorities have found that the best results have been obtained when the training has been supervised by instructors similarly mutilated. Sir Arthur Pearson attached great importance to this point in teaching the blind. "Men of St. Dunstan's," he said, "acquire these industries in a quarter of the time that is usually supposed to be necessary to teach a blinded man the trade. The whole outlook of a man becomes different when he finds himself in the hands of a teacher who works under the same handicap as himself." Arm amputees who are also blind have been taught such varied occupations as cabinet making, typewriting, and poultry farming. All the employees in Australian limb factories are men who have had limbs amputated, and are wearing limb replacements; they make the prostheses and attend to their fitting and adjustment and

encourage the wearers to persist in their use. Educational workshops are a most important part of hospital equipment, helping to tide over the necessary time of the patient's treatment in hospital.

In considering the rehabilitation of a limbless soldier it has to be decided whether he will need a prosthesis for his future occupation, or whether he will educate his sound limb to take the place of the lost parts. In the case of the upper limb, the patient will always attempt the latter; but, in addition, the remaining part of the amputated limb with or without a prosthesis should be trained.

Australian soldiers who had lost limbs in the Western theatre of war were sent to Southall, where their stumps were treated, re-amputations done, and artificial limbs supplied. Various makes of limb were tried in order to find the appropriate replacement for different amputations. These were modified or changed as required, and much trouble was taken to give the soldier as satisfactory a limb as possible. At Southall much time and thought was given to the very important problem of teaching men to use their replacements, and daily instruction was given them in this subject.

Orthopaedic centres such as Roehampton, Shepherd's Bush and Alder Hay, were very well equipped for this work, and on the arrival of patients in Australia it was continued in vocational workshops at the military hospitals in the big centres there. The immense importance of re-education and developing the habit of self-help is, I understand, dealt with later in this volume;⁹ but two British instances may well be quoted here.

Lieut.-General Sir E. C. Bethune writes in the *Handbook for the Limbless* by G. Howson.

There is no greater tonic in the mind of a man who has been unfortunate enough to lose a limb than to find out little by little how to conquer his disabilities. I myself, many years ago, had the misfortune to lose my right hand, and for six weeks, as I lay in hospital, I was exceedingly depressed, thinking that I was cut off from everything in the way of work or sport that I had performed up to the time of the loss. But I set myself to conquer difficulties and to learn to do everything that I possibly could, and, in a very much shorter time than I had thought possible, I found that the disabilities were vanishing one by one, and now there are very few things that I wish to do that I cannot do. My advice

⁹ In *Chapter XVI*, where striking Australian examples are cited.

to all my comrades similarly situated is, first and all, to set their teeth and deliberately fight against any feeling of impotence or a feeling that one is set apart as a cripple for the rest of one's life.

Sir Arthur Pearson sums up the case for the limbless in these words:

There is an extraordinary pleasure too, in overcoming a handicap—in being, if you like, a little bit of a marvel to yourself and others. A sense of conquering difficulties, a sense of self-reliance, a feeling that, though you may be blind, or deaf, or badly crippled in some other way, you are still holding a place in the normal life of the community—all this means a very great deal.

V

THE FINAL PROBLEMS IN WOUND-SURGERY: CHRONIC OSTEOMYELITIS, AND THE PHENOMENON OF LATENT SEPSIS—"FLARE"

*By Lieut.-Colonel George Bell, O.B.E.; M.B., Ch.M.,
F.R.A.C.S.*

These two conditions are made the subject of a final retrospect of war surgery because of the remarkable fact that 25 years after the war they present themselves as a not infrequent and often dramatic surgical problem in war-wounded soldiers.

In the following pages a brief account is given of them as observed in the surgical experience of the Prince of Wales Repatriation Commission Hospital, Randwick, N.S.W. This is not an exact clinical study of the subject—which space does not permit—but rather a glance at this "last scene of all" in the surgery of war wounds, the first stage of which was examined in some detail in an earlier chapter.¹⁰

1. *Chronic bone sepsis.* In spite of the fact that since Duhamel (1700-82), Hunter (1728-93), and Macewen (1848-1924), laid the foundation of our knowledge of the physiology of bone, and Kocher (1841-1917) that of its pathology, the condition has been the subject of much exact clinical and pathological study, it cannot be said that our knowledge of the process of bone disease and bone repair is satisfactory. Only too often in the history of war wounds amputation has been the only refuge from a life of invalidism.

Chronic bone sepsis apart from flares usually manifests itself by a persistent sinus, which may be associated with a sequestrum but more frequently with an area of bare bone. In most cases the bare bone is associated with a cavity, which has not healed despite repeated plastic and other surgical procedures. Amputation is the only alternative to carrying on with a persistent sinus. This is specially prone to occur in two regions—a large cavity in the head or upper end of the tibia and a cavity in the lower end of the femur.

Figures showing the incidence of the condition among returned soldiers are not available from the Repatriation Department records. A general idea as to its prevalence can be deduced from the fact that on 30th January 1942 out of a total of 168 occupied beds there were 7 cases of chronic osteomyelitis following gunshot wounds under treatment in the Prince of Wales Hospital, Randwick. At the same time 12 such patients were attending for dressings in the out-patient department.

2. *Latent sepsis: the "flare"*. One of the most remarkable and tragic phenomena in the clinical history of war wounds is the "flare"—a sudden outbreak of acute septic inflammation in wounds which to all appearances had been more or less soundly healed or at least had subsided to chronicity. It was often associated with osteomyelitis after compound fractures, and most often in wounds of the lower limb, notably in the thigh. It was found that by far the most common (though not the only) pathogenic factor was the coccal group of organisms, the wide range of whose malignant potentialities was among the discoveries of the war.¹¹

This recurrent infection in gunshot wounds has been a common cause of invalidism which for the most part has been temporary. It is an aftermath of War which has never been absent from the wards of our Repatriation Hospitals. It may occur—and has occurred—for the first time even after more than twenty-five years have elapsed since the wound was inflicted. It is true that some of these "flares" are associated with the presence of a metallic foreign body, usually a piece of a high explosive shell, but by far the greater number are associated with an inflammatory lesion of bone—an acute osteomyel-

¹¹ See Vol. II, p. 307.

itis at or near the site of osteomyelitis which was the immediate sequel of a compound fracture sustained when the wound was originally infected. Naturally our attention is arrested by those cases in which a very long interval has elapsed. However, a greater amount of invalidism has been caused when "flares" have taken place at more frequent intervals and necessitated the admission of the patient to hospital. These "flares" are to be distinguished from those which took place in healed wounds during the first few years after healing and which followed some operation such as suture of a nerve, bone grafting or forcible correction of deformities. In these the inflammatory reaction occurred after some operative or corrective procedure.¹²

In attempting to follow the evolution of these latter infections of gunshot wounds, it is most instructive to study the findings of the bacteriologists in the years immediately following infliction of these wounds as they appear to foreshadow the prevalence of "flares" in old bone lesions. When an operation was performed in the vicinity of an apparently healed wound it was not uncommon to get an infection and this after the wound had been apparently healed for many months. Among the infecting organisms enumerated were streptococci, staphylococcus, *B. Welchii* and *B. tetani*; and examination of scar tissue revealed the presence of these organisms months after the healing of the wound.

Penhallow¹³ reports a case of flare due to latent gas infection in a healed wound seventy-five days after the injury. Another case is reported of a man wounded in the early part of the war in 1914 by a rifle bullet which lodged in the neck of the femur. He returned to duty and in October 1918 was again wounded in the shoulder. The rifle bullet was removed while he was in hospital and two types of anaerobic bacilli were isolated from the bullet. No local suppuration ensued.

Concerning bacterial infection of bony tissues, he states:

(a) Bone injuries show a higher bacterial infection percentage than the all wound series, especially the compound and comminuted fractures. The flora of bone injuries is of primary importance in latent sepsis.

(b) The relative frequency percentage of the various organisms in every case is higher for the "bone injuries" than for all wounds (p. 146).

¹² An excellent account of latent sepsis and "flares" up to 1923 is given in the *British Official Medical History of the War, Medical Services, Pathology*, pp. 138-163.

¹³ In the *British Official Medical History, Pathology*, p. 143.

Referring to the histological examination of sequestra and isolation of organisms in the Haversian canals (*pp. 156-8*) he mentions

portion of hard sequestrum removed from a fractured femur two years subsequent to the date of injury showing organisms present in the depths of the tissue.

And again in a general conclusion:

The wounds of war owing to their early infection with large numbers of organisms of the anaerobic class were predisposed by the incipient gas infiltration of the tissues to the persistence of organisms in wounded tissues. Such organisms became shut off in the deeper tissues and remained latent for long periods; exactly how long is by no means clear, but periods of as long as five years have already been demonstrated. It is natural that the persistence of such infections should be accompanied from time to time with an exacerbation of the original infection following operation procedures, but it is remarkable that the actual number of flares as already defined should have been so small. Thus in 119 consecutive secondary operations of which particulars were obtained at the Royal Herbert Hospital 47 per cent. gave rise to clinical symptoms of temperature and constitutional disturbance, while 53 per cent. showed no such signs. Some of the "flares" arising after operation have been of a serious and even fatal nature (*p. 163*).

In later "flares" the inflammation occurs without any immediately preceding surgical interference.

Usually they are ushered in by general malaise, pyrexia and pain in the region of the old gunshot wound.

The pain is often so severe as to interfere with sleep. It is followed by swelling and redness as the inflammatory process spreads to the more superficial tissues. When the inflammatory process is deep-seated or surrounded by dense and sclerosed bone the pain may be very acute before the signs of inflammation appear in the superficial tissues. In some cases the recurrent inflammation has been so severe as to render the patient dangerously ill and in a few it has proved fatal. The majority of patients endure the earlier stages at home and reach hospital when the process is well developed.

As a rule the acute symptoms and signs rapidly abate when an abscess bursts or is opened by an incision in the soft parts or by drilling the bone. A sinus may persist for varying periods and later a sequestrum may require removal. In recent years one of the drugs of the sulphonamide group has been administered

on admission to hospital. Unless pain is very severe it is wise to allow an abscess to form before operating.

While any bone may be the site of a "flare", the bones of the limbs have been those most frequently affected and those of the lower limbs have predominated.

The following are typical cases from the ordinary surgical practice to-day at the Prince of Wales and doubtless at other Repatriation Commission Hospitals.

Case I (*see Plate U*). Example of a very severe "flare" 25 years after the original wounds.

Multiple grenade wounds of Right Leg and Foot, Fleurbaix, 19th July 1916. This soldier was taken prisoner and repatriated to England in December 1918. The major lesion was a compound fracture of the right tibia. He was discharged from hospital on 1st June 1919 and carried out clerical duties from August 1919 to March 1920 when he was admitted to hospital and an operation performed (by Dr. Matthews¹⁴) for abscesses and removal of two sequestra from the foot. On 14th April 1920 he was discharged to the out-patient department. At this time it was noted that there were healed scars over the front of the right tibia and inner side of right leg.

24.8.31. Right shin—scar broke down ten days ago and has been discharging a little since—a small discharging ulcer right shin. General condition good.

25.8.31. X-ray examination. Old injury to middle third of both bones of right leg. Firm bony union. Minute foreign bodies in the soft tissues. Subsequent to the healing of the ulcer a plastic operation was performed (G. Bell) on the scar on 6.1.32. This visit to hospital was the result of the scar breaking down and not a result of osteomyelitis. The urine was examined on 9.12.31 and found to be normal. From September to November 1936 he was under treatment for swelling, tenderness and pain in right foot as distinct from his right leg.

On 10.9.41 he was admitted. Temperature 99°F. which on 12.9.41 rose to 104°F. P. 124-126. Tense swelling, redness and tenderness over upper end of scar over right tibia. Had not slept for several nights because of pain. Ichthyol applied. Urine tested 11.9.41: no abnormality.

17.9.41. Abscess opened under local anaesthesia (G. Bell). Pus examined (A. H. Tebbutt). "Very few organisms in direct smear which was mostly amorphous." Culture—gram positive coccus—Staphylococcus.

During the next week pyrexia of a lower degree persisted and on 26.9.41 his condition was worse. Temperature 102°. Pulse rate 108. Leucocytes 17,200 per cubic millimetre.

The urine at this date contained a heavy cloud of albumin granular casts and pus cells. Under a general anaesthetic the incision was enlarged and several ounces of pus evacuated (Bell). On 28.9.41 his temperature had fallen to normal, but on 6.10.41 the temperature again rose, 101.8°F. and ranged between 99°F. and 102°F. until 29.10.41. Leucocytes 16,800 on 28.10.41. On 29.10.41 further incisions were made

¹⁴ Major W. F. Matthews.

in the leg and pus evacuated. Subsequent to this the pyrexia gradually subsided; on 23.12.41 there was still some discharge from the leg, but the patient was allowed to return home on crutches. During October urinary examination revealed granular casts a diminishing amount of albumin and on two occasions a few red blood corpuscles.

Comment. During the above illness courses of treatment with sulphapyridine and sulphathiazole were given. This case is a typical example of late flare associated with bone disease. The condition of the bone on 11th September 1941 is shown in *Plate U*. It is interesting chiefly for the evidence of osteosclerosis in the tibia.

Case II (*see Plate V*). G.S.W. Thigh. 1.9.18 (Mont St. Quentin) compound fracture of lower end femur. Wound healed August 1919. Flared 1932 and a persistent sinus has existed due to a cavity and bare bone in it. Only a few very minute sequestra have separated.

Comment. The cavity referred to is found in a considerable proportion of cases. Commonly (as here) they are wholly resistant to reparative treatment.

Case III (*see Plate W*). G.S.W. Right Humerus, 5.11.16 (Flers), operated on at a C.C.S.—possibly at No. 3 A.C.C.S. near Buire.

24.1.31. Swelling present in region of the un-united fracture right arm—abscess opened by Dr. Wilfred Vickers.

7.12.36. Abscess opened right arm (Dr. Bell). Yellow pus. Culture streptococci in pure culture.

9.12.36. Arm again incised. No pus found—Cellulitis.

10.12.36. Blood culture sterile.

22.4.37 Discharged from hospital and again admitted on 8.5.37.

10.5.37. Incision in right arm—pus evacuated.

On 14.6.38 was admitted to hospital Temp. 101.6°F. and flare in right upper arm. He complained of very severe pain which had begun about a week before in the region of the gunshot wound and of nausea. Swelling in the region of the wound had been noticed during the past two days. A general anaesthetic was administered and an incision was made through the scar and a large amount of pus was evacuated (Bell). A streptococcus (non-haemolytic) was cultured (A. H. Tebbutt). Temperature was normal on 18.6.38. During the next four weeks there was an occasional rise of temperature to 99°F. and the sinus persisted.

10.10.38. Pyrexia. T. 99° and an abscess was again drained (Bell) on 12.10.38.

7.11.38. T. 101.6° and on 10.11.38 T. 102°.

9.11.38. Incision medical aspect arm (Bell), small quantity of pus evacuated and temperature was normal by 14.11.38.

20.1.39. The inflammatory process in the region of his gunshot wound is very indolent and is subject to "flares". There is still a considerable

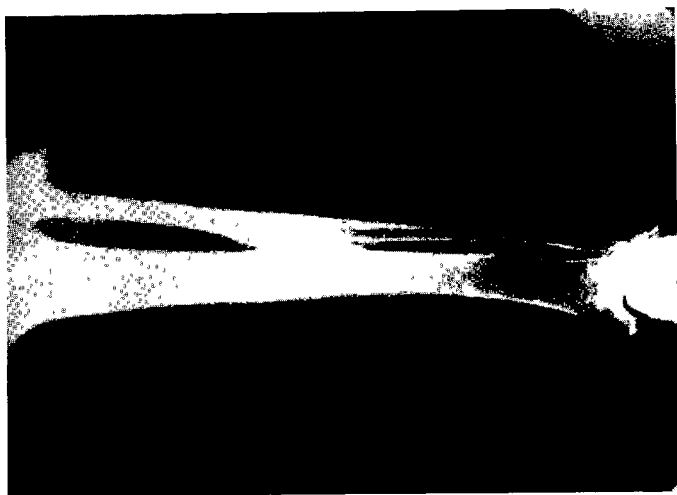


PLATE U

DENSE OSTEOSCLEROSIS OF TIBIA FOLLOWING OSTOMYELITIS

Illustrating Case I in the text

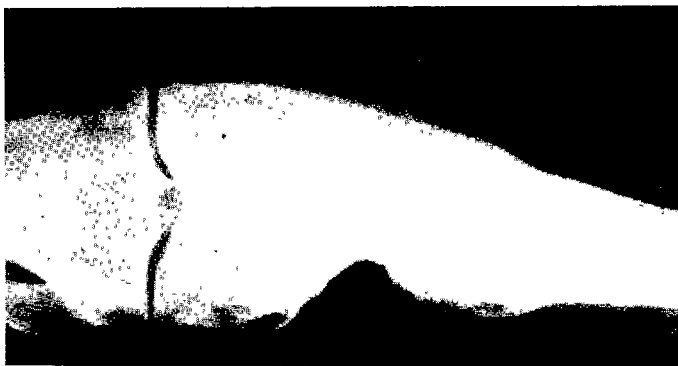


PLATE V

THIS SHOWS A CAVITY, THE FLOOR OF WHICH WAS FORMED BY
BARF BONE WHICH WAS DENSELY SCLEROTIZED

Illustrating Case II

To face p 348

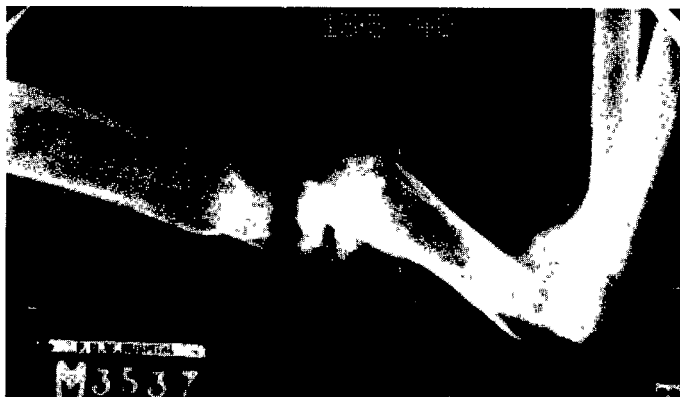


PLATE W

UNUNITED FRACTURE OF HUMERUS WITH LARGE OSTEOPHYTIC
SPURS

Illustrating Case III.



PLATE X

THIS SHOWS MARKED COMPENSATORY HYPERTROPHY OF FIBULA
(WOLFF'S LAW)

Illustrating Case IX.

To face p 349.

amount of discharge from the sinuses. Unfit for work for 3 months at least (G. Bell).

26.1.39. X-ray right arm. Marked osteoporosis—a very wide gap between fragments. Many large osteophytic spurs.

31.3.39. Severe pain and swelling right arm. Pain commenced several days ago. T. 100.6° on 1.4.39.

30.6.39. Arm flared up last week—very painful—commenced to discharge last night.

9.7.39. For several days sinus in arm has ceased to discharge. Not sleeping at night, nausea. *M. and B.* 693 given.

14.8.39. An "acute flare", but pus escaped through sinus and swelling subsided.

9.5.40. Looks sick—pain and swelling right arm. Has not slept for several nights.

13.5.40. Free discharge from sinus.

16.5.40. Direct smear from sinus. "Pus cells—fibrin—gram + cocci. Culture—a few colonies of *Staph. albus*" (*Hansman*).

17.6.40. Operation (G. Bell). Cavity between ends of bones laid freely open. Radial nerve to lateral side of cavity. The brachial artery can be palpated and lies to the medial side of the incision. Tourniquet to be placed at head of bed. Packed with gauze—ol. Ricini et Bals. Peru.

21.7.40. A flare. 2.9.40. Vaccine made from culture of pus from sinus. Streptococci (non-haemolytic) A. H. Tebbutt 13.9.40. Vaccine to be given to-day. 8.1.42. Still some discharge, but condition of arm has been much more satisfactory since operation 17.6.40.

Comment. During the last two years this patient at times was given various drugs of the sulphanilamide type, both internally and as local applications to the cavity or sinus in the arm. This was a very intractable case. One might ask why not amputate? But despite his "flail" arm this soldier has quite a useful *hand* which has served him well for twenty years. He is a fine type of man and has put up an excellent fight. *Plate W*, which shows the condition does not call for comment.

Case IV. G.S.W. Femur, 8.4.18, Villers-Bretonneux. Took two years to heal. Remained healed till January 1940. Still a sinus—a sequestrum was removed from a deep-seated cavity in shaft of femur 17.9.41

Case V. G.S.W. Left shoulder, 17.9.17, France. Healed April, 1918. Remained healed till 1939 when wound broke down. After an operation it healed in three weeks. Recurrence of inflammation 28.1.42.

Case VI. G.S.W. R. Humerus, 30.9.16, Flanders. Nine months to heal. Remained healed till 10.1.39. Discharge from wound since.

Case VII. G.S.W. Back, 27.8.15, Hill 60, Gallipoli. Took nine weeks to heal. Remained healed till 1924. Operation 1/24 took 2 months to heal. Broke down 28.1.29, remained healed until March 1939. Discharging since.

Case VIII. G.S.W. Thigh, *May 1917*. Bullecourt. Twelve months to heal. Recurred 1923, healed in 2 months. Remained healed till 20.11.41. Discharging since.

Case IX. G.S.W. Hip, *October 1917*, Belgium. Has never healed, always discharging.

Case X. G.S.W. Leg, 21.4.18, Villers-Bretonneux. Took 8 months to heal. Remained healed for 5 years—has been breaking down at irregular intervals since.

Case XI (*see Plate X*). G.S.W. Tibia, *June 1916*, Meteren. Followed by osteomyelitis and sinus formation. For this operations were performed at intervals in England and Australia, the last in *February of 1941*.

The ultimate result was (1) non-union of the tibia, (2) synostosis of the lower fragment of the tibia with the fibula, and (3) a remarkable compensatory hypertrophy of the latter.

Comment. This case presents an admirable illustration of the operation of Wolff's Law.¹⁵ The "strains and stresses" which provide the stimulus necessary to evoke the osteogenic reaction were here provided by his persistence, with the aid of a reinforced leather sheath, in "carrying on" in an occupation which involved much use of the leg; and this in spite of a deformity which, in a man of less determination, could have led to a mode of life involving, in effect, a functional disuse of the limb.

¹⁵ Wolff's Law (Julius Wolff 1836-1902) is stated by Sir Arthur Keith, *Menders of the Maimed*, p. 282 as follows:

"Every change in the form and the function of a bone or of their function alone, is followed by certain definite changes in their internal architecture, and equally definite secondary alterations in their external conformation, in accordance with mathematical laws."

Prof. Arthur Keith comments: "In framing the definition of his law of bone transformation Wolff buried in words a simple and vital truth. The late Dr. John B. Murphy of Chicago found a much simpler expression when he said: 'The amount of growth in a bone depends upon the need for it'."

SECTION II—THE NAVAL AND AIR SERVICES

CHAPTER VII

MEDICAL SERVICE WITH THE ROYAL AUSTRALIAN NAVY

*Based on a Comprehensive Narrative by Surgeon-Captain
E. T. P. Eames*

I

THE EVOLUTION OF THE AUSTRALIAN NAVAL MEDICAL SERVICE

FROM the earliest days of Australia as a British possession, the Royal Navy has played a leading part in its settlement, exploration, and defence; and the names of not a few naval medical officers have a permanent place in Australian History.

In the original plans for the projected penal settlement at Botany Bay—plans from which sprang the present City of Sydney in New South Wales—provision was made for one "Surgeon" at a salary of £182:10:0 a year and two "Surgeon's Mates" at £91:5:0 per annum each. On 24th October 1786, John White, Surgeon of H.M.S. *Irresistible*, was appointed Chief Surgeon, and William Balmain Assistant Surgeon. In 1788 the first Sydney Hospital was built, White being placed in charge.¹

The men-of-war and transports of the "first fleet"² carried their own surgeons; but in 1790 the "second fleet" was so lacking in medical organisation that a heavy death roll resulted on the hired transports, *Neptune*, *Scarborough* and *Surprise*. Stirred to activity by this, the British Government appointed a Surgeon of the Royal Navy to each subsequent transport as "Surgeon Superintendent". By virtue of the wide powers with which they were invested, these officers exercised a wholesome

¹ It had one surgeon and five assistants.

² This comprised two warships, H.M.S. *Sirius* and *Supply*, six transports carrying about 770 convicts, and three storeships averaging just over 300 tons burthen. It also carried just over 200 marines.

influence over the masters of these vessels and raised themselves high in the estimation of the unfortunate passengers.

This, and the fact that they were better educated than the majority of the settlers, gave them a high social standing in the new colony. Medical officers were well represented in pioneering and exploration. The great explorer Bass was the surgeon of H.M.S. *Reliance* and strangely enough it was he who, blown by a gale round Wilson's Promontory, explored Western Port Bay which more than a century later was to become the site of a training base for the Royal Australian Navy.

The naval defence of Australia remained entirely in the hands of the British Navy till just before the outbreak of the Crimean War, when rumoured movements of Russian naval forces in the Pacific focussed attention on the defenceless state of some of the Australian harbours. New South Wales, which felt itself protected by the existence of a British naval base at Sydney, contented itself with the formation of a naval brigade, which would act as a reserve for manning ships of the British Navy. Being largely composed of time-expired naval men, this brigade provided a valuable trained corps. Victoria, not seeing so much of Her Majesty's ships, secured first one coast defence vessel, and eventually a small number of them. The larger of them had nucleus complements of permanent officers and men, but for full manning they depended on a volunteer naval brigade. In 1884 Queensland and South Australia also established volunteer naval brigades and provided small ships for harbour defence.

In each State medical men who volunteered for service in these forces were given rank and designation corresponding with that in the medical branch of the Royal Navy. They took medical charge of the permanent staffs, attended certain drills on shore, and went afloat when the ships took the men of the brigades to sea for training. They also trained selected members of the brigades to act as "sick berth ratings". This training, like that of the brigades, was concerned largely with land operations. The medical officers were paid small annual retaining fees.

In 1869 began a series of proposals by the Admiralty and the British Government to ensure that the Australian Colonies should pay part of the cost of the naval defence of Australia;

and by the Colonial Governments for increase of the Australian squadron by the provision of ships at least partly under Colonial control and available for the training of the Colonial naval brigades.³ At the first Colonial Conference in 1887 the Governments of the Australian Colonies arranged with the Imperial Government that an auxiliary squadron of five fast third-class cruisers and two "torpedo gunboats" should be specially built in England "for the protection of trade in Australian waters". The Colonies paid five per cent. of the cost of construction and £91,000 yearly towards the upkeep of the vessels, which became part of the British squadron on the Australian station and were manned by officers and men of the Royal Navy, but could not be removed from the Australian station without the consent of the Colonies. If the agreement terminated they would revert to the Imperial Government.⁴

When in 1900-1901 the Boxer outbreak occurred in China and the Europeans in Peking were besieged, three ships of the Auxiliary squadron were allowed to serve there and the South Australian gunboat *Protector*, and a naval brigade raised by voluntary enlistment from the naval forces of New South Wales and Victoria were also sent and served with the British section of the International Force. With them went a detachment of four medical officers each from the contributing Colonies with twenty-five sick-berth ratings from the New South Wales Naval Brigade; the P.M.O. of the British force afterwards reported that it rendered excellent service.⁵

While that campaign and the South African War were in progress, on 1st January 1901, the six Australian Colonies federated. On March 1st the local naval force in each State was taken over by the Commonwealth Government though it was not until 1904 that they came under Commonwealth law (the newly passed *Defence Act*) and were placed under command of Captain W. R. Creswell as "Director of Naval

³ Rear-Admiral G. Tryon, sent to the Australian station to help forward a solution, wrote in 1886 that the true solution was—not the payment by the Colonies of a subsidy but the personal service of "our countrymen all over the world". This suggestion, though rejected at the time, proved to be actually the true solution. The best account of these problems and their solution is in the *Australian Encyclopaedia* (Naval Defence).

⁴ The two best known of these ships were the old *Ringarooma* and *Karakatta*. Queensland did not sign the agreement until 1891.

⁵ The senior medical officer Surgeon-Captain Steele died during the campaign in Peking.

Services" in Melbourne. His command included only a heterogeneous collection of little ships and forces, the real naval defence of Australia being still supplied entirely by the Royal Navy. In 1903 the Commonwealth Government had concluded an agreement with the Imperial Government, replacing that of 1887 to which New Zealand also became a party. Under this the Royal Navy supplied an increased force in Australian and New Zealand waters; Australia and New Zealand paid a yearly subsidy towards the cost; and provision was made for training in these ships the Australian and New Zealand reserves of officers and men. In addition, a certain number of men were enlisted for five years' continuous service with the squadron, but entirely under British officers. The Australians thus serving formed what was known as the "Australian Naval Force".⁶

Three light cruisers were allotted for their training. No Australian sick-berth staff was included in these arrangements—the Australian personnel came under the care of the R.N. medical officers. The Australian Naval Brigades were still maintained, and in 1905 the control of the local forces was transferred to a Naval Board comprising the Minister for Defence, the Director of Naval Forces, and a Finance Member.⁷

The arrangement by which Australian seamen—but not officers—served in a subsidised squadron was never satisfactory. The policy of Admiral Tryon⁸ and Captain Creswell, supported by Alfred Deakin and by Australian progressives and labour, won so much ground that at the Imperial Conference in 1909 the Admiralty agreed to Australia's providing her own squadron as part of the Royal Navy. For the first time that squadron would be a considerable force—one battle cruiser, three light cruisers, six "river class" destroyers and three submarines. Two of the destroyers, built in Great Britain, H.M.A.S.'s *Parramatta* and *Yarra* were commissioned in 1910 with crews sent from Australia supplemented by thirty ratings

⁶ They were given by the Commonwealth Government a higher rate of pay than the R.N. ratings, but the sum representing the difference was withheld and paid at the termination of their service. Provision had been made for the Australian Colonies to be allotted yearly a certain number of cadetships for training as regular officers of the British Navy.

⁷ In 1911 this was increased by the addition of second and third naval members.

⁸ Tryon had lost his life on 22 June 1893 when during a manoeuvre his flagship, the *Victoria*, was rammed and sunk with great loss of life by the *Camperdown* in the Mediterranean.

lent by the Admiralty. The third, H.M.A.S. *Warrego*, was launched in Australia in April 1911 and commissioned on 1st June 1912. So was born the Royal Australian Navy. It was to be trained to a standard that made its ships and officers interchangeable with those of the Royal Navy, and therefore the establishment of training institutions, especially of a Royal Australian Naval College for officers, was a basic part of the plan. It was permitted to fly the white ensign and take charge of the waters round Australia.

Meanwhile the naval brigades were reorganised. When compulsory service was introduced under the *Defence Acts* of 1909-1911,⁹ the naval authorities were given first selection from the annual quota of trainees. The permanent staffs of the local brigades trained these youths, who were given a little sea experience in the old gunboats *Protector* and *Gayundah*. The trainees were medically inspected by medical officers attached to the brigades who also gave instruction in first-aid and ambulance work. But the trainees could be called on only for service in Australia; for recruits for the regular sea-going service the old wooden ship *Tingira*¹⁰ was commissioned¹¹ in April, 1912 and moored in Rose Bay, Sydney, for training boys enlisted at the age of 14½ to 16 years, to serve until 25.

In July 1912, District Naval Medical Officers (corresponding to the Principal Medical Officers in the Military Districts) were appointed in the capitals of the six Australian States and Sub-district Naval Medical Officers in other seaport towns where naval brigade training was going on.¹² A month later there entered the service its two first permanent sea-going medical officers.¹³

⁹ See Vol. I, p. 14

¹⁰ Formerly the reformatory ship *Sobraon*. By the outbreak of war in 1914, 295 *Tingira* boys had joined the fleet; 776 more joined it during the war.

¹¹ The *Tingira* was under the medical care of Staff-Surgeon Brennand, later District Naval Medical Officer in Sydney.

¹² Some of them had been connected with the State naval brigades before the federation of Australia. The most notable of these was Staff-Surgeon Sloggett, D.N.M.O., Melbourne, who, having been a medical officer in the Victorian Navy, remained as medical officer of the Williamstown Depot after the Commonwealth assumed authority and, continuing in this capacity, acted as medical adviser to the Naval Board until the appointment thereto of a sea-going officer. He thus formed an active link between the medical services of the States and the Royal Australian Navy. At the outbreak of war he again took medical charge of the Depot and was directed by the Naval Board to supervise the fitting out of the hospital ship *Grantala*.

¹³ In Aug. 1912, the first of these, Surgeons Caw and Darby, were appointed to *Encounter* and *Cerberus* respectively. In November of the same year Surgeon MacFarlane joined, relieving Surgeon Caw, who went to England to undergo a course

Besides the *Tingira* boys, sea-going recruits were enlisted for seven years' service. The medical examination of these began in 1912. The authorities adopted the high standard of the Royal Navy.¹⁴ Until the middle of 1913 the examinations were conducted by the District Naval Medical Officers at the local Navy Offices. It was found, however, that to gain a uniform standard, the local examination could only be regarded as provisional, the final entry resting with the medical officers of the depot ship *Cerberus* at Melbourne and of the *Tingira* at Sydney.

The Royal Australian Naval College for cadet midshipmen opened in March 1913, in the first place at Osborne House, Geelong¹⁵ and in 1915 was transferred to special buildings at Jervis Bay.

At the beginning of 1913 the Australian Navy in Australian waters comprised the following ships and "shore establishments":

H.M.A.S. Cerberus—An old coast defence turret ship formerly belonging to the Victorian Navy, her name being assumed by the Naval Shore Depot at Williamstown, Victoria. Attached to her as tenders were two old torpedo boats and *H.M.A.S. Paluma*, a river gunboat formerly belonging to the Queensland Navy.

The three new destroyers *Parramatta*, *Yarra* and *Warrego* were attached to this establishment.

Sea-going training ships controlled directly by the Naval Board were:

H.M.A.S. Encounter—a second class cruiser lent by the British Government.

H.M.A.S. Protector (an obsolete gunboat formerly belonging to South Australia) training ship for Royal Australian Naval Brigade trainees, moving round the coast as required, and *Gayundah* (an old Queensland river gunboat) doing similar duties on the Queensland coast.

of instruction given to surgeons on entry to the Royal Navy and to join *H.M.A.S. Australia* on commissioning, an additional officer, Surgeon Roberts, joining the same ship in England early in 1913. In December, Surgeon Scott-Mackenzie was, on entry, appointed to the *Cerberus*, relieving Surgeon Darby who followed Surgeon Caw to undergo a course in England and to join *H.M.A.S. Sydney* on commissioning. The medical officer appointed to the *Melbourne* in England was Surgeon W. J. Carr.

¹⁴ It may be noted here that it was not found necessary to alter the standard during the war. In the later stages of the war Great Britain was forced to enlist in the Royal Navy men of lower category for shore or harbour services but this was not necessary in Australia whose Navy depended on Great Britain for its bases of supply, and whose small harbour service was manned by the Royal Australian Naval Brigade.

¹⁵ It was under medical charge of the sub-district naval medical officer (Dr. Newman).

Of the new ships from Great Britain the light cruiser *Melbourne* arrived in March 1913 and took over the three destroyers as their "parent ship", their complements now coming under medical charge of Surgeon Carr of the *Melbourne*.¹⁶ The British third class cruiser, *Pioneer*, handed over by the Admiralty, took the place of the *Protector* in training the Royal Australian Naval Brigade, Surgeon Melville Anderson being appointed to her.¹⁷

On 1st July 1913 the Royal Naval establishment at Garden Island was handed over to the Commonwealth Government as a going concern. Amongst the material taken over was a stock of medical stores—drugs and instruments—and complete stores and fittings for a hospital ship (No. 8 in the Admiralty Mobilisation Scheme). Fleet-Surgeon Brennand, R.A.N.B. of the *Tingira* took charge also of these stores and of the medical responsibilities at Garden Island.¹⁸

In August 1913 arrived the battle-cruiser *Australia* and light cruiser *Sydney*, and the Royal Australian Navy thenceforth maintained a sea-going squadron.¹⁹ This first entered Port Jackson on October 4th, *Australia*, *Sydney*, *Melbourne*, *Encounter* and three destroyers passing through Sydney Heads in line ahead, *Australia* flying the flag of Rear-Admiral G. E. Patey. The squadron was completed by the arrival in May, 1914 of the submarines *A.E. 1* and *A.E. 2*.

Manned at its inception by a large proportion of officers and men from the Royal Navy, the Royal Australian Navy naturally borrowed its discipline, organisation and traditions from that Service which has been the pattern to so many navies of the world. The newly joined medical officers having

¹⁶ Submarines and destroyers did not carry medical officers. They were supplied with medicine chests, but for medical attention were dependent on their parent ship or, in her absence, on the nearest ship carrying a medical officer.

¹⁷ In Apr. 1914 a policy was instituted of attaching all medical officers to the *Australia* for three months to gain experience. The first—and as it happened the only—officer thus posted was Surgeon MacFarlane.

¹⁸ Garden Island was so called because, on the arrival of the First Fleet in Jan. 1788, vegetables being scarce and scurvy and dysentery threatening, a garden was made there for H.M.S. *Sirius*. Her log says "11th February, 1788. . . . Sent one officer and twenty men to the Garden Island to clear the ground for a kitchen garden for the Ship's Company." The island garden was passed under the care of one ship after another for many years, until Governor Macquarie claimed it as part of the Domain. It did not return again into the possession of the Navy until 1865.

¹⁹ The keel of another light cruiser, *Brisbane*, had been laid down at Cockatoo Dock, Sydney, in Jan. 1913. Until she should be ready for sea to make up the total of three light cruisers, H.M.S. *Encounter* was lent to the Commonwealth.

no experience of a naval service, were thus saved many difficulties. Ready to their hands were a well tried routine and an ample scale of stores. The sick-berth staff at first consisted mostly of trained British ratings or pensioners, but in 1913 twelve probationary sick-berth attendants were training at Williamstown Depot. Six of these, after six months' training, were sent for additional training to the Royal Naval Hospital at Haslar in England, the rest being drafted to ships.²⁰ As may easily be imagined also the experienced R.N. ratings were of great assistance to the newly-joined medical officers, particularly in the making of the statistical returns from which the general health of the Service and the work of the medical officers are gauged and the compiling of which makes an important part of the duties of the naval medical officer.

During the early part of 1914 the new medical service found its place in the ordered routine of life on ships of war. At the same time the administrative machinery and organisation on shore made good progress in co-ordinating Australia's resources to the requirements of her Navy.

At the outbreak of war the fleet comprised the following modern ships (if the *Encounter* may rank as such)

Battle cruiser:		Displacement.
<i>Australia</i>	.. .. .	19,200
Light cruisers:		
<i>Sydney</i>	.. .. .	5,400
<i>Melbourne</i>	.. .. .	5,400
<i>Encounter</i>	.. .. .	5,880
Destroyers:		
<i>Parramatta</i>	.. .. .	700
<i>Yarra</i>	.. .. .	700
<i>Warrego</i>	.. .. .	700
Submarines:		
<i>AE 1</i>	.. .. .	800
<i>AE 2</i>	.. .. .	800

and the following older ships

Light cruiser:	
<i>Pioneer</i>	.. .. . 2,200

²⁰ The arrangements for dealing with sick and wounded on board ship are described later, but it may be explained that the sick bay is the ship's hospital and the sick-berth ratings are men trained in first-aid, nursing, and dispensing. They pass through grades from probationary sick-berth attendant up to what at that time was known as "Chief Sick-Berth Steward"—now as "Sick-Berth Chief Petty Officer".

Gunboats:

<i>Protector</i>	..	..	..	..	..	..	..	..	920
<i>Gayundah</i>	..	..	..	..	..	..	..	..	360
<i>Paluma</i>	..	..	..	..	..	..	..	..	360

During the war the following were added²¹

Light cruisers:

<i>Brisbane</i>	..	..	..	..	..	..	..	..	5,400
<i>Psyche</i> (old)	..	..	..	..	..	..	..	..	2,100

Destroyers:

<i>Huon</i>	..	..	..	..	..	..	..	..	700
<i>Swan</i>	..	..	..	..	..	..	..	..	700
<i>Torrens</i>	..	..	..	..	..	..	..	..	700

Sloops:

<i>Fantome</i>	..	..	..	..	..	..	..	..	1,000
<i>Una</i>	..	..	..	..	..	..	..	..	980

What these ships meant to Australia, to the British possessions in the Pacific, and to the British Empire as a whole in the Great War is told in the *Australian Official History*.²² The part taken by the medical service in these events forms the subject of the following pages.

II

ORGANISATION AT THE OUTBREAK OF WAR

A man-of-war in full commission is always ready for active service. Her company must always be physically efficient and therefore the most important of the medical officer's duties is the prevention of disease. He also has under more general supervision the food and clothing of the men, and the water-supply, ventilation and general hygiene of the ship. If a case of infectious disease occurs he must take immediate steps to prevent its spread: and should the ship visit a port where epidemic or endemic disease or other threatening conditions are known to exist, he must advise the captain as to the steps necessary to preserve the health of men. He must be ready to detect disease and deal appropriately with it.

These duties, in addition to those of caring for the sick

²¹ At one time or another the following also were commissioned; auxiliary cruiser, *Berrima* 11,137; armed patrol ships, *Sleuth*, *Coogee*, *Mouribyang*, *Sumatra*; store-ship, *Aorangi*, mother ships, *Upolu* and *Estura*, hospital ship, *Grantala*, besides mine sweepers, etc.

²² Vol. IX, *The Royal Australian Navy*, by A. W. Jose.

and injured, place him in the position of a general practitioner who is also a medical officer of health. The centre of the medical organisation is the sick bay or hospital where the sick and injured are seen and treated by him. The *Australia* and all the cruisers had sick bays, but destroyers, sloops and submarines had none. The sick bay varied in size with the ship, but the general arrangement was fairly constant, and a description of the *Sydney's* sick bay will serve to illustrate the provision made throughout the fleet.

The *Sydney's* sick bay was forward on the starboard side of the main deck, with sliding doors aft. It was lighted and ventilated by ports and a skylight. Four cots could be slung fore and aft in pairs, one in each pair being superimposed with an arrangement to hold each cot steady if it was not required to swing. The bay also contained a knee hole table and washstand for the medical officer, and a bath and a venereal trough, each of which could be curtained off. The bath, fitted with a polished wood cover and leather mattress, could be used as a couch for the examination of patients.

On the inboard side were lockers for patients' clothing, the X-ray cabinet, and a stove. At the after end were a mess table and settee for convalescents. A door foreward led into a lavatory. Forward of the sick bay was also the dispensary²³ which communicated with the sick bay by a window with a sliding shutter.

To meet the needs of war two extra medical officers were appointed to the *Australia*, and one to each of the light cruisers, making four available in the former and two each in the latter. The sick-berth staff in the battle-cruiser was increased by one sick-berth attendant, but the smaller ships had to be content with their peace-time complement in this respect. War stores of surgical necessities were drawn by the ships at the outbreak of hostilities. These are supplied in units, each consisting of one medical and one surgical chest containing anaesthetics, drugs, dressings, and so forth.²⁴

The system for dealing with casualties in action was based upon the principle that the medical service and medical stores were of greater value after than during a fight. The medical

²³ This contained also a cupboard for the storage of bedding.

²⁴ In peace-time ships are supplied with Emergency Surgical Chests (with dressings and drugs for surgical work) in addition to their liberal supply of surgical stores. The chests are hermetically sealed, only opened in an emergency, and when this happens a report must be sent in detailing the circumstances. The units of war stores are practically amplified Emergency Chests. Against the contingency of landing parties being required Field Service Chests and valises were issued to the *Australia*, and later to two small vessels on patrol duty in eastern waters.

officers and their immediate assistants were accordingly divided into parties and stationed below the water line, behind armour or otherwise protected as much as possible. In the *Australia* two battle stations were provided for and were supplied with facilities for the stowage of dressings, with operating tables, medicine and instrument chests, and with tanks of fresh water with steam geysers for heating it. The senior medical officer, however, not being satisfied by the protection afforded in these two stations, abandoned them at the outbreak of war and, having three medical officers with him, divided the medical staff into four parties which were stationed in the starboard and port engine rooms and in fan flats of boiler rooms, respectively. This placed all the medical staff in the "vital" and therefore best protected positions in the ship. Dressings and splints were divided up and placed in these four spaces, with an additional reserve supply in the wardroom storeroom, well below the water line. The dressings were made up into packages which were put into pillow cases and two of which could be packed in a seaman's bag, protected from damp and dirt. Bags so packed were placed in each battle station. The battle stations in the light cruisers are described later in the report on the *Sydney-Emden* fight.

The first-aid party, which was distinct from the stretcher parties, was generally formed by officers, stewards, cooks, writers from the Accountant Branch, and the ship's police. Where a chaplain was borne he also was attached to the medical staff. The first-aid parties were trained and their members detailed for special duties so that when "action stations" was sounded each knew his task and what stores he had to convey to the battle stations. In the light cruisers, which had no fixed stowage room for stores below decks, all instruments, utensils, records, and dressings had to be cleared out of the sick bay and taken below every time the ship went to action stations. The bathrooms had to be washed down with disinfectant, instruments and dressings laid out, an extra supply of hot water provided, besides drinking water, milk and Bovril for the wounded.

For giving immediate aid to the wounded certain ratings such as captains of guns, coxswains and bowmen of boats and leading stokers, had been trained in first-aid, and as a

rule this training was extended until the whole ship's company possessed in some degree this useful knowledge. So that it could be put into practice, first-aid bags or boxes were distributed to guns, fire-control positions, bridge, conning tower and engine rooms. These packages usually contained first field dressings, picric acid dressings, bandages, cotton wool, safety pins, a tourniquet, scissors, and iodine. In addition, boric lotion was supplied to gun crews for bathing the eyes when irritated by cordite fumes.

The stretchers used in the naval service were:

1. The Furley Stretcher similar to the Army stretcher, fitted with wheels and a folding traverse bar.

2. The bamboo and canvas stretcher which consists of a strip of canvas the sides of which are sewn over to form loops through which bamboo poles are passed. The poles are kept apart by iron bars, having a loop at each end which can be slipped over the poles. There are two rope handles on each side for carrying. This stretcher is light and efficient and easily rolled up.

3. The "Neil Robertson". The material of this consists of strips of bamboo fastened lengthways on a backing of canvas on the principle of Gooch splinting. It has transverse canvas straps fitted with buckles, and at each end are slings by which it can be hoisted or lowered in a vertical position. It is fitted with rope handles at the side for carrying in a horizontal position. This is by far the most useful stretcher for naval purposes. When not in use it is easily carried by one man, and it can be stowed in a small space. When in use it closely envelopes the patient, splinting and protecting his whole body, and enabling him to be safely moved in a vertical position—an important factor in a modern ship where hatchways are narrow and ladders nearly vertical.²⁵

The stretcher parties generally consisted of cooks and stewards, three men to a stretcher; in the *Australia* stokers were used. Each party was supplied with a first-aid bag and water bottle and told off to attend to a particular part of the ship. They were stationed in protected positions with orders not to expose themselves unless definitely directed by the medical officers.

Though casualties can be dealt with to a certain extent

²⁵ Another appliance used largely during the war for transport of sick and wounded from ship to hospital or to another ship, was the canvas cot—a rectangular wooden frame wrapped in laced canvas, of which strips extended to form the sides and ends. In the triangular apexes of the canvas ends are eyes by which, with rope, the cot can be slung. A mattress is placed on the frame-work, and when a patient is being carried the sides and ends can be folded over the blankets to form an additional covering. These cots can be slung in the same way as an iron cot and can be easily scrubbed and disinfected. Though fitted with rope handles at the corners they are usually carried on the shoulders of four men.

in the battle stations during action, it is after the "cease fire" has sounded that the work of the medical staff really commences. The wounded are then deliberately collected and brought to a space fitted up as a temporary hospital. Where this is must depend on the damage sustained by the ship. The sick bay, if undamaged, is most suitable; failing this, the space having the most light and air.

Though little can be done for the wounded in a ship during the height of an action, much can be done to lessen shock and allay mental and bodily anguish by the administration of morphia. Comparatively large quantities of this drug, in tablet form and in solution, were issued to ships, and medical officers were provided with Wildey's syringes—instruments peculiar to the naval service.²⁶

For dealing with wounded no detailed instructions were laid down as ships differ in construction and organisation. The medical officer, whilst adhering to certain general principles, had to make arrangements suitable to his surroundings. In the Royal Australian Navy only in one instance was this organisation put to a practical test. In a later section of this chapter the reader will be enabled to gauge the strain placed upon it in a small ship far from a base, burdened not only with her own wounded but with those of her antagonist.

III

AN OUTLINE OF THE R.A.N.'s SERVICE

Except in the *Sydney-Emden* fight, the operations against the German cruiser *Königsberg* in which the *Pioneer* took part, the engagement of the naval brigade and some punitive operations in the islands north of Australia, and those of the Royal Australian Naval Bridging Train at Suvla Bay on Gallipoli, and the submarine *A.E. 2*, no Australian naval unit was actually in action. A collision between the *Australia* and *New Zealand* robbed the former of a share in the Jutland battle.

The chief tests of the Australian Naval Medical Service

²⁶ This syringe was devised by Surgeon Rear-Admiral Wildey. It consists of an all metal hypodermic syringe with a needle *in situ* enclosed in a metal sheath in shape like a rubber finger shield which firmly grasps the upper end of the barrel. To the upper end of the sheath a safety pin is fitted so that the instrument can be attached to the medical officer's coat. When required it can be easily withdrawn from the sheath ready for instant use. Wide-mouthed amber glass bottles of morphia were also provided, the mouths covered with thin rubber.

therefore, were due to the exposure of the crews to every climate, their confinement to the ships, and unaccustomed restriction in the character of their food. The stokehold and engine-room complements had to bear a particularly heavy strain in steaming in tropical climates for long periods with only short breaks.

At the outbreak of war the *Australia*, *Melbourne* and *Encounter*, which were in Sydney, left for the north. They had been active in filling up with medical stores including war stores.²⁷ The squadron's first task was to find, if possible, and fight the German Pacific Squadron. With this object the flagship with the *Sydney*, *Encounter*, and the destroyers *Warrego*, *Yarra* and *Parramatta* patrolled German New Guinea, Rabaul, Rossel Island and the Solomon Islands. The British Government, however, having decided to ask Australia and New Zealand to seize German New Guinea and Samoa, the squadron was diverted from its first object and covered first, the New Zealand expedition to Samoa, which was occupied on August 30th²⁸ and then the Australian "Naval and Military Expeditionary Force" for German New Guinea. The force comprised a naval brigade (six companies of Naval Reserves) and a battalion of infantry, the whole being under Colonel William Holmes. It was transported in the auxiliary cruiser *Berrima*. Early on September 11th two parties each of twenty-five of the naval brigade were landed in New Britain, where lay the seat of the German New Guinea Government, Rabaul. Their object was to find and seize the wireless station. The party that landed at Kabakaul was strongly opposed as it pushed inland. Reinforcements were brought up and the Germans and their native troops were outflanked and surrendered. The leader of the reinforcements, Lieutenant-Commander Elwell, the medical officer, Captain Pockley²⁹ and two seamen had been killed and four men wounded.

²⁷ The Senior Medical Officer of the *Australia* drew from store two hundred pillow slips for his own ship, and others for the *Melbourne* and *Encounter* in proportion. These were to contain sterilised clothing for the gun crews with a view to diminishing the risk of sepsis to those who might be wounded.

²⁸ The *Pyramus*, *Psyche*, *Philomel* and French cruiser *Montcalm* joined in this operation. The *Sydney*, *Encounter* and destroyers had returned to bring up the Australian expedition for New Guinea.

²⁹ The *Berrima* had a naval surgeon, an R A N. medical officer as ship's surgeon, but the Naval Board had arranged that the military authorities should provide the medical staff for the expeditionary force.

The wireless station was next seized resistance having ended.³⁰

The German Pacific Squadron now suddenly on September 14th arrived off Samoa. The main part of the squadron, then on the way back to Sydney therefore hurried back to Rabaul and, having covered the occupation of Madang in New Guinea, moved to Fiji, from which the *Australia* patrolled in an effort to locate the enemy. Later, when searching in company with Japanese cruisers, the *Australia* heard of the enemy's destruction. She was at once summoned to England and sailed thither by the straits of Magellan.

The Australian squadron, its formidable enemy gone, was not assembled again. The *Sydney* and *Melbourne* escorted the first contingent of the A.I.F. across the Indian Ocean and then, passing through the Suez Canal and Mediterranean, made for the West Indies, where at the beginning of 1915 they were employed searching for large raiders. Later they ranged from the coast of Brazil to Bermuda, the waters east of New York and Halifax.

The destroyers, after the operations in German New Guinea, returned to the coast of Australia in November, but at the end of the year were again in New Guinea waters.

In 1915 most of the Australian ships were patrolling in tropical waters. In the Atlantic the *Sydney* spent 214 days in the tropics and steamed 50,000 miles in 236 days during the year. During August and September she was transferred to the New York patrol, with headquarters at Halifax. This duty involved periods of fourteen days at sea, with five days in harbour. The *Pioneer* was in the Indian Ocean helping to blockade the *Königsberg* with Zanzibar as a base. At the request of the British Government, which feared the smuggling of arms in the Bay of Bengal, two British ships at Sydney, the *Psyche* and the sloop *Fantome*, were commissioned by the Australian Navy in July. The *Psyche*, based on Rangoon, patrolled the Burma coast; the *Fantome* searched and surveyed among the Andaman and Nicobar Islands. The climate of these places was hot and humid, and malarial fever rampant everywhere. Whilst carrying

³⁰ Submarine *A E 1* was lost with all hands on 14 Sept. 1914 off New Britain.

out surveying work in the Nicobar Islands, Nancoury was made the headquarters rendezvous, a landing party of six men being landed for ten days to guard some Chinese; observation parties were also left in some places for a week at the time.

The *Encounter*, with a ship's company of 430, left Sydney in January and cruised to Fiji, Tonga, and Auckland. In a second cruise she visited Suva, Apia, Fanning Island, Christmas and Johnson Islands and returned to the Fijian and Tongan groups. After visiting the New Hebrides, she cruised at the end of the year to Thursday Island, Sunda Straits, Direction Island and Singapore.

The destroyers *Parramatta*, *Warrego* and *Yarra* during the greater part of the year patrolled the east coast of Australia, but went north to Singapore and Sandakan in November.

The *Una*, (the captured German yacht *Komet*) was employed in 1915 patrolling round German New Guinea, steaming as far east as the Gilbert Islands as far north as Sandakan. She went into dock at Singapore at the end of January 1916 and whilst there acted as depot ship for invalids from the various Australian ships in those waters. As the medical officer pointed out, the discharging of invalids to a small ship, especially when she was in the midst of a general overhaul, was to be deprecated. She left for Sydney in March with eighteen invalids, three of whom were in an advanced stage of pulmonary tuberculosis. On arrival they were all discharged to Garden Island and the ship subsequently returned to her old cruising ground about German New Guinea.

The only important Australian ship which spent the whole year in cool waters was the *Australia*, which on reaching Plymouth at the end of January, gave four days' leave to each watch, and left on February 12th to serve with the Grand Fleet.

The *Australia* remained there for the rest of the war and was joined in October 1916 by the *Melbourne* and *Sydney*.

1916 The ships took part in the sorties, sweeps, and later, the convoy operations in the North Sea, winter and summer, with rare intervals of leave largely spent by Australian sailors in London.

Of the ships in the tropics the *Encounter* visited Saigon and Sandakan on her way to Western Australia, and spent the rest of the year on the Australian coast. The *Fantome* cruised round Borneo and the Andamans, with a few weeks at Singapore. The *Psyche* moved to Borneo and cruised from Sandakan. The three destroyers too patrolled from Singapore and Sandakan. The *Pioneer* remained on the East African coast until October.

On 31st October 1916, H.M.A.S. *Brisbane*, a sister ship of the *Sydney* and *Melbourne* built at Cockatoo Dock, Sydney, was commissioned and sailed by the Suez Canal to the Mediterranean, arriving early in 1917 at Malta, where she refitted.

In 1916-17 there occurred a general redistribution of the ships in the tropics. In the second half of 1916 destroyers, the *Huon*, *Swan* and *Torrens*, built in Sydney were sent to Malaya and Borneo to relieve the other three, which returned to Australia. It had been intended that the older and newer destroyers should relieve each other alternately for the health

of the crews, but in 1917 the submarine menace
1917-18 in the Mediterranean so increased that the Admiralty asked for the destroyers to be sent thither.³¹ At the same time, German raiders reached the Pacific and the *Brisbane* was therefore sent thither. The *Encounter*, *Brisbane* and two Japanese cruisers at one time or other patrolled Australian or neighbouring waters during the danger period. The *Pioneer*, *Psyche* and *Fantome* being too small to be sent against raiders were put out of commission by September 1917.³² The six destroyers were sent to the Mediterranean where, based on Brindisi and Malta they helped to bar the mouth of the Adriatic Sea against the exit of submarines. On reaching Aden the mother ship, the *Esturia*, left them, necessitating the transference of the medical officer to one of the destroyers. In the last weeks of the war the destroyers were sent to the Aegean and to the Black Sea, the *Swan* actually visiting Kertch, Marioupol, and Taganrog in the Sea of Azov.

In the North Sea the *Australia* headed the port line of

³¹ During 1917 and 1918 the first batches of midshipmen from the Royal Australian Naval College joined the Australian and British battleships. They were noted as being of good physique, very intelligent and self-reliant.

³² The *Fantome* afterwards patrolled in the Islands.

British capital ships as they escorted the German High Sea Fleet to its custody in Scapa Flow.

IV

TREATMENT OF WOUNDED IN NAVAL ACTION

The fighting in New Guinea on 11th September 1914 called naturally for military methods. In the forenoon two medical officers with a sick-berth attendant were landed at Kabakaul from the *Australia* and formed a casualty clearing station in a store at the end of the jetty. The wounded, including Germans, were transferred to the *Yarra*, which was lying close in, and from her to the *Australia* on the same evening. The next day a wounded officer, Lieutenant Bowen, was sent back to the *Berrima*, and one of the wounded who had died was buried at sea. On the 13th, when the hospital ship *Grantala* arrived, two of the wounded with some sick from the *Australia* were sent to her.

The only naval action of which the Australian Naval Medical Service had experience³³ was that in which the *Sydney*, when escorting the first Australian and New Zealand contingents across the Indian Ocean, was detached on 9th November 1914 to destroy the German cruiser *Emden* fifty miles away at the Cocos Islands, and after fighting from 9.40 to 11.20 a.m. drove her ashore completely battered. The *Sydney* was then four days' steaming from the nearest hospital, and for six days her S.M.O., Surgeon Leonard Darby and his assistants had to deal with their own ship's wounded and, most of the time, those of the enemy also. The incident has not lost its interest or importance even amid the general experiences of two wars, and Surgeon Darby's report is therefore quoted here in full. (The treatment of a selection of particular cases is described in small type.)

"At 7.30 a.m., on November 9th 1914, I heard a rumour that a strange warship was at the entrance to Cocos Islands, fifty miles distant. Soon this was confirmed, and though we had had many false alarms previously, instructions were given to get everything below and prepare for action.

**Sydney-Emden
Surgeon Darby's
report**

³³ In East Africa the *Pioneer* when sending in a boat had two men hit by rifle-fire from the shore.

"The stations for the surgical party and the stretcher-bearers with their stretchers are the fore and aft ammunition lobbies. Two theatres, one for each surgeon and his assistants, are prepared in well separated stokers' bathrooms, which are situated off the tunnel running up the centre of the ship. These bathrooms are 12 ft. by 8 ft. by 7 ft. in size and supplied with hot and cold water; also, they contain lockers in which dressings can be stowed. Though not quite below the water line they are well protected, above by two decks, and on the sides by armour and coal bunkers. One of these bathrooms was appropriated and it was permanently rigged up as a theatre with the operating table, instruments, and dressings stored there ready for immediate use. Unfortunately, only two days before the action everything had been taken up to the sick bay, and the room had been painted out with the intention of returning to it on this very day, when the paint was dry. Before the action began at 9.30 a.m. there was only time to get the equipment down without proper stowing, and it was not placed so conveniently to hand as would have happened at any other time. The No. 2 action theatre is not kept ready equipped, but is rapidly fitted up when required, with the sick bay mess table as an operating table, and stores are taken along the tube from No. 1 theatre. Adjacent to these stations are six more bathrooms, which are cleaned up as well as possible under the circumstances, and they are very useful as shelter places for the wounded as they are brought below.

"In addition to the water-supply in the bathrooms there was an emergency supply in the Captain's and wardroom galley, further aft, along the tube. This was fortunate, because when our guns had been firing for ten minutes the water came through the bathroom taps black, muddy, and useless.

"On sighting smoke at 9 a.m. I went round the guns and control stations to see if the first-aid bags were correct; thence to the sick bay to ascertain if anything useful had been left behind; but before I could get below to my station our guns opened fire.

"The *Emden* soon hit us, and within five or ten minutes from the commencement of the action the first wounded man

was brought below to me by the unengaged gun's crew, the stretcher parties having instructions not to go on deck during the action unless directly ordered.

"The first man had a fracture of the right leg and thirteen shell wounds. He was in great pain and I gave morphia, ordering the sick berth steward to attend to the wounds and put on a splint rapidly, because now a constant stream of wounded men came down who required urgent attention. The second case was shot through the chest, and was bleeding freely, with the apex of the heart beating through a hole in the chest wall, a loud inrush of air through the wounds, and marked air hunger. Pads and tight bandages were rapidly applied to the wounds, a large dose of morphia being given.

"Before this case was attended to another was brought down who had various shell wounds of the right leg, thigh, and buttock, with perforation of the right eye, and two others who were very badly wounded. One of these men had been shot through the abdomen in the left hypogastric area, the fragment emerging in right lumbar region leaving 8 in. of omentum hanging out of the wound; moreover, this patient was burnt from head to foot. The other was shot through the base of the heart and soon died. I rapidly administered large doses of morphia and applied first dressings. In the meantime two more men had been carried down, and all available space near my station was taken up, so I gave orders to some of the stretcher party to give first-aid assistance and to convey wounded—who were temporarily dressed—to the wardroom, and to place them on beds and blankets from the cabins.

"One of the last wounded to arrive had been badly injured in both feet, the left foot being almost shot away; one had a large gaping flesh wound in the right thigh, and severe burns of the face, hands, and forearms.

"Whilst attending to these men, I received a message from the Captain to send for a wounded man on the upper bridge, and gave orders to the forward stretcher party to bring him down to the theatre. Soon after this all the wounded, with the exception of one who died within ten minutes of coming down, had been removed to the wardroom and placed in beds on the deck. The wardroom was only protected by thin armour, but space had to be cleared near the theatres, and this was the only available place. By now the *Emden* was not so dangerous, and, fortunately no damage was done to this part of the ship.

"Another case, wounded in the left thigh and the right arm, was soon dressed and taken to the wardroom. We were now clear round our station, and I went aft to see the wounded in the wardroom, on my way passing Surgeon Todd's station. He had all this time been equally busy, and had been

handicapped by the fact that on four occasions his sick berth attendant had fainted.

"After visiting the wardroom I returned to No. 1 theatre and found that the stretcher party had returned from the upper bridge with the above-mentioned wounded man. It had been a difficult place to get at, but with the aid of a Neil Robertson stretcher no great loss of time had been incurred. This stretcher, by the way, was most useful, and well adapted to a ship of this class, with steep ladders, small hatchways, and narrow passages. The wounded man had sustained a severe injury to his left leg, which had been shot away at its junction with the trunk.

"This was the last of our wounded excepting two slight cases, one with a small fragment in the forearm, another with a slight wound of foot, these two being attended to some hours later.

"'Cease fire' sounded at 11.15 a.m., after we had been working two solid hours in a confined atmosphere at a temperature of 105° F.

"The wardroom now contained eleven cases, most of whom were restless and in pain. The initial dose of morphia, in no case less than $\frac{1}{2}$ gr., had been of only slight value, and there was reason to suppose that the solution in the phials supplied had deteriorated. Fresh doses of morphia were administered, and iced water, soda water, and brandy to the various cases as thought fit.

"At first hydrogen peroxide solution was used for wet dressings and cleansing, mainly because it was the most convenient. The picric acid dressings in the first-aid packages were found most useful for the cases of burns.

"During the action the space below was very congested, the tunnel being full of men belonging to the ammunition and fire parties. At the best of times there is little room here, so the regular transport of wounded men was considerably impeded. All the time we knew not how the fight was going—we could only hear orders for ammunition and the continual rapid fire of our guns. At one time, when we heeled over and the operating table took charge, it seemed as though

the ship had been badly hit, but we soon found out that this was only due to a sudden alteration of course.

"Our constant attention was now taken up by two very severely wounded men. Normal saline was administered in the first case subcutaneously and in the second into the median basilic vein. Their wounds were redressed and all methods of reducing shock were tried. One of these men died after enduring much pain two hours after being wounded. The other improved somewhat after the saline, but air hunger was pronounced, and he complained of constriction round the chest. There was oozing of blood from his wounds and his pulse was very weak.

"The remainder of the cases were not so urgent, but many were in considerable pain, and all that could be done was to re-dress until operative interference could be carried out. The wardroom was rapidly equipped as a hospital, lotions, dressings, etc. being placed therein, and the first-aid party did excellent work in looking after the wants of the wounded. The actual extent of injuries could not be definitely made out until the cases were upon the table. As soon as the sick berth staff could be spared I gave orders that the sick bay was to be prepared as an operation theatre with all despatch. On account of the state of recent sites of activities and of the sick bay, which was flooded with water from the fire mains, this entailed a large amount of work. Confusion below was unavoidable owing to lack of room and the speed with which one had to work; so it took some time to sort out equipment and stores, and have everything conveyed back again and arranged in the sick bay. Moreover, there were many necessary interruptions due to requirements of the cases, and all through the afternoon and evening German sailors were being picked up out of the water, some of them in a very collapsed state. One man had been in the shark-infested sea for nine hours, but was brought round after some trouble and next day was none the worse for his immersion.

"It was found to be impossible to do any surgery until the following day (November 10) for numerous reasons, nor was it considered advisable on account of the condition of the wounded. The sick bay staff was too exhausted to get the theatre ready, with instruments and dressings sterilised, for that day, and neither medical officer was in a fit state to

undertake operations before adequate rest. Until midnight we were attending to the wants of the patients, doing dressings, giving hypodermic injections, passing catheters, etc. The two sick berth ratings were sent to bed at 10 p.m., thoroughly worn out, and Surgeon Todd and myself took four hourly watches from midnight, the first-aid party and volunteer nurses having been told off into watches to do the nursing.

"Early next morning (November 10) we arrived at Cocos Island Cable Station, and having ascertained the damage done here we took off the Eastern Extension Telegraph Company's surgeon (Dr. H. S. Ollerhead) to help us with the German wounded. We then steamed back to North Keeling Island, to the *Emden*.

"We now had the sick bay rigged up as a theatre, having unshipped the beds and made more room. Our chief difficulties were lack of space and trained assistance, and we had used up all the sterile towels on the day of action; also there was much delay in getting instruments re-sterilized. The shortage of trained theatre staff with lack of conveniences caused delay in the preparation of the theatre between each case, and the actual operations were delayed because one could not get what was required in quick time. Later in the day we organised a theatre staff from volunteers. They helped to clear up, held basins, handed stores and dressings and did much remarkably useful work with a composure that was astonishing, as they were present at many bloody operations to which none of them previously had been in any way accustomed

"Surgeon Todd acted as anaesthetist, and Dr. Ollerhead assisted me with the operations. The first case taken was one of thoracic wound; from the dyspnoea and oozing of blood it was obvious that there was much blood in the pleural cavity, his colour being bad and also his pulse. Despite operative interference the haemorrhage recurred and the patient died two hours after the operation.

"The next case was shorter and less serious, consisting of numerous wounds in both lower limbs. The left leg had been traversed by a fragment which left a lacerated wound through the calf just below the knee-joint. There was a large entrance wound in the right calf, charred at the edges, the fragment being deep in the muscles. There was another smaller deep wound in the right thigh on the inner surface, and numerous smaller wounds on buttocks and back. There had been considerable haemorrhage, but this was controlled by plugging. A search was made for fragments, but none could be felt with a probe, and it was decided

not to cut down and look for them, because more harm than good would have been done. The wounds were therefore thoroughly cleansed, syringed out with hydrogen peroxide, and plugged with iodoform gauze. With careful dressing they remained clean, and patient was doing well when he left the ship. There was a good deal of destruction of muscles and nerve tissue, but the main vessels and nerves had presumably not been damaged. An X-ray photograph taken at the hospital at Colombo showed numerous pieces, none very large, of shell in the right leg; but it was there decided that it would be unwise to try and remove them then.

"By this time (November 11) we had returned to the *Emden*, which was flying distress signals. Arrangements now had to be made for the transshipping and reception of about eighty German wounded; the figures are the estimate of the surviving German surgeon. All available stretchers, hammocks, and cots were sent to the *Emden* with a party under Dr. Ollerhead, who did not return till the last patient left the ship some four hours later. Even then some men who had got ashore could not be brought off till next day (November 12).

**Taking *Emden's*
wounded,
November 11**

"The transshipping was an exceedingly difficult undertaking, as there was a huge surf running on the beach where the *Emden* was ashore; therefore the collection and lowering of the wounded into the boat was necessarily painful. They were taken on board the *Sydney* in the cots and stretchers by means of davits, but there was no davit available in the *Emden*. One German surgeon was uninjured, but he had been unable to do much, having had twenty-four hours with so many wounded on a battered ship, with none of his staff left, and with very few dressings, lotions or instruments.

"The *Emden* was riddled with gaping holes; it was with difficulty that one could walk about her decks, and she had been gutted by fire.

"The wounds of the Germans who were brought off to the *Sydney* by this time, only twenty-four to thirty hours after injury, were practically all very septic, with maggots $\frac{1}{4}$ in. in length crawling over them. Little had been done for them, but now they were attended to by our party, and transhipped to us as quickly as possible. The best arrangements possible under the circumstances were made for the reception and treatment of the wounded as they arrived. All blankets and

beds available were drawn from store, and most of us were left without our own beds and blankets. As they came inboard they were taken down to the temporary hospital in the wardroom, where Surgeon Todd and myself attended the more serious cases and directed the first-aid party with the simpler dressings. I tried hard to keep the sick bay clear and ready for operations later, but we were soon crowded out of the wardroom, and the sick bay had to be used as a dressing station, the wounded being placed along the neighbouring corridors and spaces adjacent, and soon there was scarcely room to move. Besides the seventy wounded received that day, there were over 100 prisoners and twenty Chinamen from the sunken collier. The crowding can easily be imagined, especially as we were a full ship before.

"Of necessity, the work done now was only immediate and temporary until the cases could be sorted out and put under anaesthesia in a clear theatre. From thirty-five to forty of them were serious, the remainder being more or less slightly wounded who were able to help themselves somewhat and wait.

"After having attended to the cases requiring immediate assistance we cleared and cleaned up the theatre; for the constant stream of cases had left it in confusion. Operations had to be discontinued at noon, but we recommenced about 6 p.m. and did not stop till 4.30 a.m. on November 12.

"The first case was a German, whose right leg had been almost severed just above the ankle. The German surgeon assisted by Dr. Ollerhead, with Dr. Todd as anaesthetist, amputated the leg successfully in the middle third, the case did very well. We now gave our attention to our own patients, and after dinner began with an ordinary seaman (R.A.N.) who had over thirteen separate shell wounds, most of them severe; they involved the right buttock, thigh, leg, and foot; both bones were fractured 2 in. above the ankle, and, in addition, there was a large area blown out of his left groin, exposing the femoral vessels and spermatic cord. It looked at first as though we should have to amputate, but we decided to give it a chance, and after cleaning up the wounds with soap and water, H_2O_2 and iodine, and removing all accessible foreign bodies, we inserted iodoform drains, and put up the leg in a back-and-side splint. This poor fellow had been in considerable pain; he was now put under charge of a special nurse in the Commander's cabin. All future dressings had to be done under anaesthesia for about fourteen days, but the latest report is that leg has been saved.

"The next case taken that night was an A.B. (R.A.N.) who had a

shell wound the size of a crown in his loin just below last rib on left side. Earlier in the day he had retention of urine, and a catheter was passed withdrawing almost free blood, so evidently the fragment had lodged in or passed through his kidney. Patient had had a good deal of pain, but apart from a pale colour his general condition was very good. Under chloroform the wound was cleaned up and I traced down the track of the fragment with a probe below the twelfth rib, $2\frac{1}{2}$ in. from the vertebrae, but could feel nothing; the wound, which was foul, was enlarged with a scalpel, and I tried to get my finger on to the metal, but without success. Eventually, from fear of carrying infection in too deeply, I decided to wait and contented myself with draining the wound. The haematuria was much less on the following day, and patient had no retention. He continued to improve and within two days there was no blood in the urine; he was landed in hospital doing well, but still with fragment in his kidney and some slight discharge from the wound. Later news says he is convalescent.

"After a spell of half an hour, Dr. Ollerhead, Surgeon Todd, and myself, with the assistance of three volunteers, got the theatre cleared up, instruments, lotions, and dressings ready, and commenced operations again.

"The patient was a German with a shattered right leg, which was fractured and mutilated in the middle third. The wound was horribly offensive, gangrene had set in, and infection was spreading up the veins to the thigh. This was thirty-six hours after injury. There was a tourniquet round the leg just below the knee. The man must have lost a good deal of blood, but his condition was very fair considering all things. Under chloroform it was decided to amputate above the knee; this was done by an anterior skin flap and a modified skin and muscle flap by transfixion posteriorly. A good covering was obtained with a very satisfactory stump, but he died of heart failure the next day.

"Early on November 11 the sick berth staff attended to a stream of less severely wounded who presented themselves at the sick bay. The remainder of the Germans who had got ashore on North Keeling Island, some of them wounded, were brought on board by a party from this ship, which, on account of nightfall and the surf, had been unable to return on November 10. We next returned to Cocos Island and landed Dr. Ollerhead who was not able to come on with us. I cannot lay too much stress upon the great assistance so generously afforded by the Eastern Extension Company's surgeon. Much to our relief, the *Sydney* now sailed for Colombo at 20 knots, after having had to spend some forty-eight hours round the *Emden* after the action. We attended to the fresh batch of German wounded, but only two were serious; one

was put on the table in the forenoon and the other later in the afternoon.

"An A.B. (R.A.N.) was the first case to be taken on November 11. The distal half of his left foot had been shattered by a bursting shell, and there were numerous fragments buried in the tissue of the left leg and thigh. The outer side of the sole of his right foot was furrowed down to the metatarsals and one toe was carried away. With Surgeon Todd as anaesthetist and S. B. S. Mullins (R.A.N.) as assistant I cleaned up the wounds, by now quite offensive, with H_2O_2 , alcohol and ether, removing metal where possible. The left foot was amputated at the transverse tarsal articulation, sufficient sound tissue having been obtained from the sole to make quite a satisfactory covering. The case took some time owing to the number and state of the wounds; a drain tube was left in the stump, which healed quite quickly, and the patient is now convalescent. During this operation the German surgeon was attending to the dressings of his fellow countrymen on the waist deck, where they were taken after operation. The sick berth attendant was overcome and had to be sent on deck for an hour to recover. All this naturally added to our difficulties, seeing that 50 per cent. of the staff was *hors de combat*.

"We next had another A.B. (R.A.N.) taken to the sick bay for operation. Dr. Luther now was anaesthetist, and Surgeon Todd assisted. This man, besides having a hole through the left palm and various shell wounds all up the right leg, had a minute splinter which entered the right eye through the upper lid, carrying a small fragment of the orbital bone into the eye and disintegrating that organ; as it had become inflamed and swollen, and a large amount of pus had collected in the orbit, it was decided to remove the eye. Patient is now reported to be convalescent.

"The next case was a German whose left forearm had been mutilated, muscular tissue had herniated through the skin, and both large vessels had been severed. A tourniquet placed round the lower third of the arm had saved the patient from bleeding to death, but amputation was necessary through the middle of the arm. A drainage tube was inserted into the wound and the stump healed with little difficulty. This man had refused to have the operation at first, but eventually consented on the advice of his messmates and the German surgeon.

"Next case was similar to the above, only his forearm was even more damaged; he had managed to get a tourniquet placed round the arm, and was later blown overboard. He had succeeded in swimming ashore through the surf, and was brought off to this ship after being on shore about forty hours. Besides the above injury he had a large flesh wound of left thigh, which afterwards became erysipelalous. By the time he got to us all his wounds were very septic. The patient was very weak from loss of blood and exposure, and his life was saved on shore by our party who gave him cocoa-nut milk to quench his thirst through the night. His constitution was wonderful, and his stature and physique magnificent. He appears to have been the only man on the upper deck saved. Circular amputation in the middle of the arm was performed. This case was somewhat difficult owing to the great muscular development of the arm; a satisfactory stump, however, was obtained which healed well; but for three days the patient ran a very high temperature due to the erysipelalous wound of his left thigh.

"The remainder of this day (November 11) was occupied in cleaning up and dressing wounds, and putting up fractures, most of them under anaesthesia. At midnight we went to bed after a spell of over forty hours without any sleep.

"Early on November 12 minor injuries were attended to in the sick bay. In the forenoon we did general cleaning and dressing of wounds. By night we had finished off all the operations and the bigger work as far as initial treatment was concerned, but we had by no means been able to get up to the theatre all the cases which required careful and thorough attention.

"All this time we had to organise and arrange a hospital, with its equipment, and the feeding and nursing of patients; up to now this was turned over to the first-aid and volunteer nursing party, and they received the cases straight from the theatre. In the case of the Germans we had a party told off from the prisoners to help our staff. We had two large wards, the wardroom and the waist deck, and various special wards, a few cabins being given up by officers. Our wounded were in the wardroom, but were sometimes carried on deck as it was very hot below. The Germans filled the waist deck and, though cooler here, they were very much exposed to heavy rain in spite of extra awnings, side curtains, and sweepers told off by the Commander. A special party, under the chaplain, was organised to look after the feeding of the patients. The moving of wounded to and from the sick bay was considerable and, in consequence of narrow hatchways and doorways combined with limited space, it was rather difficult work. The stretcher parties were kept very busy and responded well to the call on them.

"By nightfall one could look round with a feeling that some impression had been made on the work, and later that evening the German surgeon and myself went round sorting out the cases we could send off next day to the *Empress of Russia*, an armed liner which had been despatched to help us with the wounded and relieve us of our 230 extra men.

"This ship joined us at 10 a.m. on November 13 and we had all the wounded ready for transshipping. Fortunately, the weather was calm, and about 60 patients, besides 100 prisoners,

were moved within two hours. We sent over all the cases that could walk and about 25 to 30 cot cases; and but for the fact that we had to wait for our cots to be returned to send over more patients we should have finished much sooner. We also transhipped 18 Chinamen, the crew of the sunken collier, and then we had more clear space on the decks for the wounded. We had kept 25 in all. I retained all our own wounded men and the severest of the German cases, including those we had operated upon. It was thought inadvisable to move these. A fresh supply of blankets was obtained from the *Empress of Russia*, and most of our bedding and blankets were thrown overboard as they were septic and offensive, there being no chance of disinfecting them for some time. We now had more space and, things being much straighter and cleaner, we could look after the remaining cases better and were able to take down the dressings of and examine the cases we had operated upon earlier in the week. Between now and the evening of November 14 we had given each case a thorough overhaul and were able to discharge them to hospital on November 15th in a fairly clean condition, though most of them were more or less septic.

"We arrived in Colombo at 10 a.m. on November 15th, when the military took over the wounded, placing them in the Station Hospital till that was full, and the remainder in the Civil Hospital.

"After the wounded left the ship it was some time before she could be cleaned, as we were coaling for nearly two days. The corticene decks of the wardroom, sick bay, and starboard corridor had to be scraped, as they were thick with marine glue which was unavoidably fouled by dressings and discharges from wounds. All these places were then well scrubbed out, and next day the Colombo health authorities came and sprayed out with cyllin the whole of the living spaces in the ship. Some of the bedding was destroyed, and the remainder was put through the steam disinfecter. Numerous heavier articles, such as gymnasium mats, which had been used as beds, were sent ashore to be disinfected.

"At 9 a.m. on November 19th we left Colombo after having gone through a very trying ten days. It would be very

difficult to imagine a more severe test for the medical staff of a cruiser, and an action where so many wounded could be rescued. Thus we had an abnormal list of wounded from the enemy's ship added to our own. The ship was overcrowded, and most unsuitable at any time as a hospital ship. We were delayed forty-eight hours round the scene of action, and were distant four days steaming at 18 knots from the nearest hospital.

"The best antiseptics were found to be hydrogen peroxide and iodine with alcohol; hydrogen peroxide was most useful for septic wounds."³⁴

V

HEALTH OF THE R.A.N., 1914-18.

The loss of service due to enemy action was a small matter compared with the loss of efficiency through disease.

Unfortunately the Australian naval records include practically no medical statistics and therefore permit no really scientific study of the health of the Royal Australian Navy during the First World War. The account here given is based on little more than general observation. Nevertheless the experience is interesting and valuable.

Two sets of circumstances militated against the health in the Navy under war conditions; first, those obtaining on board the ships; second, those of climate and shore disease. In the ships overcrowding, deficient ventilation, deficiencies in the character of the dietary at sea, and confinement of the ship were the most unfavourable conditions.

General considerations

Overcrowding arose from the fact that the ship's peacetime

³⁴ The limited experience of the R.A.N. suggested that the organisation for treatment in and after action was on the right lines. After *Jutland*, hospital ships and hospitals reported that many of the wounded received from ships had been so well dealt with that no further immediate treatment was necessary.

The Neil Robertson stretcher and man-handling—especially the latter—proved the best methods of moving wounded on board, stretcher parties required instruction with them.

Though after-care of the wounded was principally a matter for the trained sick-berth staff, it was necessary to call on the first-aid party to help. In the *Australia* in 1915, as a result of the experience gained in the *Sydney-Emden* action, the first-aid party was instructed in elementary nursing. *Australia's* S.M.O. considered that the first-aid instruction for guns' crews, etc., need not be fully comprehensive. He drew up a pamphlet telling them in simple language the first-aid treatment of haemorrhage and fractures.

complement had to be increased by about twenty per cent for war service. With free ventilation this would not be of serious moment, but at the outbreak of that war the ventilating arrangements in war-ships generally were inadequate for the altered conditions, especially in the tropics. The full defects were immediately brought out by the process of "darkening ship". This necessitated closing all ports, blinding them with deadlights (steel plates screwed down) and covering all skylights and hatches at night when the living spaces were crowded. The air below decks became heated and foul. Natural ventilation, which before the war was the principal means of air supply to compartments above the water line, was greatly interfered with even in harbour by this necessity. The medical officers soon secured what remedies they could, providing windsails, opening hatches, and making such modifications of the artificial system as could be carried out in the ship.³⁵ In ships built during the war a complete artificial system of supply and exhaust for all spaces below the upper deck was provided.

Though a large number of cases could be treated on board if necessary it was considered advisable to send to hospital patients requiring lengthy bed treatment. In the North Sea patients sent to hospital ships or naval hospitals were sent from there as a rule to one of the big naval hospitals at Chatham, Portsmouth or Devonport. It was not certain that on discharge an Australian seaman would be drafted back to his original ship or even to an Australian ship, though this was done wherever possible.

Ships serving in the Indian Ocean and China Sea sent their cases as a rule to military hospitals, although those on the coast were generally of a makeshift character. In view of this the *Psyche's* M.O. suggested that ships should be given the option of sending their cases to the well equipped civil hospitals at the ports.

In some cases men invalided overseas were allowed to leave

³⁵ An ingenious method was proposed in the *Australia* in 1916—the cross circuiting of the supply and delivery trunks of the ventilating fan so that it could be made to supply or exhaust alternatively. In some ships outlets of the supply pipes were sometimes unwisely placed rendering them either of little value or productive of unpleasant draughts.

the transports and go to their homes before being medically examined in the Naval Depots, with the result that subsequent claims for compensation were difficult to deal with.

It will be noted that the Australian Navy's service fell mainly in tropical waters or the North Sea. For the first two months of the war the squadron, with little preparation, served almost entirely in tropical waters. With all the defects in ventilation, officers and men had to live in a warm, moist atmosphere, and with a deficient supply of fresh food. Yet their general health remained good, and their enthusiasm and spirit very high. The S.M.O. of the *Australia* noted:

Our sick list has gone down to five. There was a wonderful difference the day after the trouble began. No man who can help it will come now for fear of being kept from duty. . . .

and this experience was general. The good general health at the end of the year was doubtless partly due to the careful examination of recruits and their subsequent physical training.

The patrols in 1915-17 in Malaysia and the Bay of Bengal were perhaps the most trying, but those in the West Indies also were a fairly severe test. There, as might be expected the extensive steaming by the *Sydney* and *Melbourne* threw a great strain on engine-room and stokehold ratings who became debilitated and anaemic. Some had to be sent to hospital at Bermuda. The *Sydney* spent July refitting there and sick were sent to the Royal Naval Hospital. No leave could be given as the men, especially engine-room ratings, were required to carry out most of the refit, but the place was healthy and excellent bathing did much to restore the men's tone whilst there was no opportunity for them to contract venereal disease. The general health was good.

Despite the fact that at other times a fair amount of leave was given to the *Sydney's* men when in harbour in the West Indies, no cases of serious tropical disease appeared. As she was fitted with refrigerating plant, salt or preserved provisions were used only on 76 days. Tropical fruits were freely obtained except when patrolling off the coast of South America where the lack was felt. The medical officer noted the benefit of the

change to Halifax where blue uniform was worn for the first time for eight months.³⁶

The medical records for the *Pioneer* at Zanzibar are meagre; the health of her company seems to have been excellent in 1915, but the sick rate in 1916 was fairly high though not through any particular disease.

In the ships on tropical patrols in the Pacific, the health of the *Encounter's* company was at first very good—the visit to Auckland gave a welcome change. The cruise to Fanning Island was trying, this ship having no refrigerator or cooling plant and that quarter of the year showed the heaviest sick list. Of her company of 540, 85 were boys and young ordinary seamen, who were much affected by the heat, absence of fresh food, and continuous monotony of diet. During the last quarter, though the conditions were similar the sick list was comparatively small, probably showing that the ship's company was becoming acclimatised.

In the sloop *Fantome* in the Bay of Bengal, constipation with gastric catarrh was not uncommon owing to the tinned food and lack of the usual green vegetables. Even at Port Blair only potatoes and onions from India or Burma could be obtained but the ship carried live pigs and chickens, and was able to obtain some tropical fruits and vegetables. Half an ounce of "lime juice" (really lemon juice) daily, doubtless prevented some ill results of deficiency of vitamins in the preserved food. The ship's company included twelve boys and some young ordinary seamen who, in addition to doing arduous surveying work, had to undergo other training in other ways. Her low sick rate in 1915 was remarkable, it was noted that these young ratings all increased in weight, whereas the older ones lost it, though retaining good health. Nevertheless the advantages of cold storage were overwhelming. A

³⁶ An interesting note was made by S.M.O. *Sydney* on the extermination of that pest so common in ships, especially in the tropics, the cockroach. Apart from the possibility of their being carriers of disease, they are very destructive and their presence is accompanied by an unpleasant odour which renders nauseating any article of food they have contaminated. In 1916, after three years' commission, the

Sydney was swarming with them, but early in June when the ship was in the Atlantic, they began to disappear with the appearance of two species of spider accidentally introduced. In about two months the spiders—a large hunting spider and a smaller web builder—had cleared the ship of cockroaches, and, with the exhaustion of their food supply, they themselves perished, nothing being left but numerous corpses enmeshed in their own webs.

Cockroaches

fortnight at Hong Kong was the only cool break in a period of sixteen months otherwise spent by this ship close to the equator.

The *Fantome* had a very satisfactory record of health during 1917.³⁷ When this small ship was recommissioned in 1918 and spent eleven months in the tropics serious sickness was small though the mess decks were damp and overcrowded and tinned food formed a large part of the diet. The men's resistance, however, was lowered. This showed itself when the ship was infested by a small reddish-brown ant with a very virulent bite causing a rapidly spreading cellulitis from a barely perceptible local lesion. Patients gave poor response to treatment directed towards localising the sepsis from the bites.

In 1915 the sloop *Una*, with a complement averaging 113, had 124 cases of illness. In October and November 1916 she was in the hurricane belt with a temperature of about 90° Fahrenheit, humidity of 80-90 per cent. and rain falling most of the time. Her sick list for the year had been very low, but the medical officer who joined her in January 1917 noted that conditions of respiratory catarrh were apt to become chronic and refractory to treatment. In a strong report he pointed out that any physical weakness was soon laid bare in the tropics, and urged that greater care should be taken that only the physically fit were drafted to ships serving there; any other course resulted in the early invaliding of men difficult to spare or replace.

In 1918, after a refit in Sydney in February, the *Una* returned to the Bismarcks and German New Guinea, and remained in the Islands until December. Though the general health of the men again remained comparatively good, the moist heat and confinement to the ship tended to cause neurasthenia.

In the small cruiser *Psyche* the medical officer when furnishing his September return in 1916 took the step of writing to the Commanding Officer, pointing out that the ship had been performing arduous duties under unhealthy climatic conditions

³⁷ The few malarial cases were recurrences of the disease originally contracted at Hong Kong Venereal disease was negligible, and the only entry of any note was that of seventeen cases of "pyrexia", which it was found difficult to distinguish from dengue on the one hand and influenza on the other. None was serious.

since August 1915, and strongly recommending that she be transferred to a cooler station in order to preserve health and efficiency, especially as many of her complement were young ratings. A change to cooler atmosphere for a fortnight in September did good, but was too short. In 1916, of her company, whose average daily strength was 207, 262 men were placed on the sick list with a loss of service of 1,188 days on board and 3,213 in hospital. Half of this total was made up by forty cases of influenza and venereal disease.

In the destroyers the average number of officers and men in each ship was 73, the accommodation being ample and ventilation satisfactory. The patrols lasted sometimes for two or three weeks. Though the *Esturia* was with the flotilla as a mother ship, she had no refrigerating plant and could carry only a ton of ice in her ice room. The destroyers thus had little fresh food when on patrol, and at one time were ten days without vegetables of any kind, even potatoes. Yet the men kept remarkably well. Sport and sea bathing⁸⁸ were encouraged.

In 1917 it was noticed in the *Encounter*, cruising among the Islands, that whenever the ship's company had to go on to tinned food, although there were no complaints as to its quality, the sick list increased, and when fresh food was available health improved. But even in ships with cold storage the equipment was insufficient to supply those on board during long patrols. The foods most missed under these conditions were green vegetables and fruit. On the China stations *Psyche* and *Fantome* were able to obtain such vegetables as potatoes and onions.

The effects of long confinement to the ship depended partly on the other conditions, but even where these were mostly favourable the psychological effect of the monotony of patrol work cannot be ignored. Vigilance could never be relaxed though no enemy might be known to be near. No fight relieved the monotony. Even in harbour it was not always possible to give leave. The resulting nervous irritability was increased by prolonged exposure to tropical heat which pressed more particularly on the engine-room hands and stokers.

Yet, though cases of neurasthenia did occasionally appear,

⁸⁸ The canvas baths used on patrol were very popular.

morale was not appreciably lowered. On board the ships, bands, concert parties, gramophones and the cinematograph did much to keep the men amused, and when in harbour route marches and organised games provided exercise. But it was spells of leave with their complete change from the routine and restraint of ship life that helped most to restore the general tone.

In the tropics men in small ships when possible slept on deck, but they were frequently driven below by rain. In general any change to a cooler climate resulted in an immediate improvement in general health. Temporary reliefs of ships at more frequent intervals, or more frequent change of the ships' companies, would have brought greater efficiency.

In the *Encounter*, in 1915, 11 cases of heat stroke were recorded. Five were ascribed to the effects of the sun, and the others to the heat of the stokehold. The *Psyche* in 1917 had eight cases

Heat stroke of a peculiar form well recognised in the Bay of Bengal. The patient suddenly felt intense headache, frontal and occipital, with nausea and epigastric pain, temperature rising to 103°-104° and the tongue remaining clean until the second day of the disease. Sodium salicylate with sodium bicarbonate gave relief in forty-eight hours, and the patient returned to duty within a week. No relapses occurred. The difficulty in diagnosis was due to the resemblance of the symptoms to those of gastric influenza. The practice of administering quinine was strongly condemned as it increased the headache and had little effect on the temperature.

In the *Una*, in 1917, septic abrasions, which in the tropics are troublesome and refractory, were the subject of observation by Surgeon G. W. Sinclair. After experiment he concluded that Eusol, made fresh, with the dressings kept moist and frequently changed, was more effective than other antiseptics. If there was much pus, a preliminary soaking in hydrogen peroxide, with subsequent swabbing with carbolic lotion (1-70) before dressing was beneficial. After the sore was sterilised antiseptics retarded healing and were replaced by a two per cent. ether lotion, but it was found that if the sore was not sterilised before the lotion was applied, pus rapidly reappeared and antiseptic treatment had to be resumed.

The incidence of purely tropical disease, even malaria, was slight because men had little opportunity of landing outside civilised settlements. Indeed, except among the landing force that fought in New Guinea the only cases reported in 1914 were five of mild dengue fever in the *Encounter* at Suva, Fiji.

In the West Indies malaria caused little trouble in the Australian ships. Several cases occurred in the *Sydney*, but in the *Melbourne* only one—a remarkable fact seeing that the disease is prevalent among the

negroes, hundreds of whom were in contact with the men when coaling ship at a time when mosquitoes were a pest. There was ample opportunity for infection for the ship frequently spent periods of ten to fourteen days in harbour, often alongside a pier. In East Africa in 1915 the *Pioneer* had eleven cases, which, however, gave little trouble.

Malaria

The chief source of infection was in the Pacific. In the *Encounter* when docked at Singapore in 1915 no cases were reported. Five grains of quinine bisulphate were administered to each man daily and permission was obtained from the manager of the dock to oil pools and casual water in the vicinity. In the destroyers also, at Sandakan and Singapore, comparatively few cases occurred, which was remarkable seeing that they frequently anchored close to the shore and mosquito nets were not used. Quinine was given in eight-grain doses twice weekly. None of the cases was malignant.

The work of the *Fantome* in the Andamans involved the sending of many parties ashore, and they were not landed for more than a day at a time. Despite this only five cases of malaria were reported. All the men were provided with mosquito nets of ample size and quinine prophylaxis carried out. Quinine sulphate was given, at first in ten grain bi-weekly doses but later, on the advice of the officers of the Royal Army Medical Corps with local knowledge, in doses of fifteen grains given on two days running every ten days. At Port Blair, of the Somersetshire Light Infantry 800 strong, 500 were unfit for full duty mainly through malaria.

While the *Fantome* was at Hong Kong in 1916 her men were sent into camp at Stonecutter Island, which had been previously declared suitable by a medical board, which made no mention of malaria. The men, however, were ordered to take and use their mosquito nets. Nevertheless eight mild cases appeared and were proved by blood examination. The Commodore at Hong Kong ordered a diligent search of the island for the mosquito breeding place but without success.

When the *Brisbane* reached the Solomon Islands in October 1917 four schooners were commissioned from the ship for special service. Malaria was locally prevalent, and the officers in charge of the schooners were supplied with extra quinine. The ship later anchored off Gizo, where many mosquitoes were being caught on board—mostly culicidae, but a number of anopheles were seen. The ship's task necessitated her anchoring close to the shore for three weeks, the men being employed ashore after dusk. Fourteen cases of fever appeared, all definitely identified as of the benign tertian type. Part of the mess deck was made mosquito proof, and all affected men turned in there at dusk until their blood was free from parasites. The cases were mild and responded readily to vigorous quinine treatment; the S.M.O. was of opinion that the constant prophylaxis had considerably modified the disease.

The *Una* in New Guinea waters was the chief sufferer. In 1915, in a crew of 113, 14 cases were noted⁸⁹ but in 1916 the number greatly increased. In her two months in the hurricane belt 40 cases were recorded. Altogether, during the last quarter of 1916 94 cases, including recurrences, were treated, with a loss of service of 915 days.

In December the ship was in Sydney, where, despite the season, the comparatively cold southerly winds were accompanied by recurrences of

⁸⁹ Also 7 cases of "coastal fever"—its nature is not indicated.

malarial fever. Before she left Sydney to return to her station, all men who had suffered from malaria were very wisely taken out of her. This meant that about 40 per cent. of the ship's company had to be replaced, but it is satisfactory to note that between February and October 1917 only one fresh case appeared and only 13 entries were made under this heading. This result was ascribed to the dryness of that season and the thoroughness with which the Army authorities had eradicated the mosquito in Rabaul and at outlying garrisons. A small expedition was landed on Malekula, where, during the rainy season, mosquitoes infected with the sub-tertian malarial parasite abound. Fortunately it was the dry season and, during three days in the bush no mosquitoes were seen or felt.

In 1918 in the Islands malaria was again the chief cause of disability in the *Una*, though of the benign type. The *Brisbane* had 14 cases in the first quarter of that year.

In the Mediterranean the Australian destroyers based in 1918 on Brindisi, where malaria exists, reported very few cases⁴⁰

The treatment of ratings who returned to Australia suffering from malaria was reported on by Surgeon Stephens, R.A.N.B. Early in 1915, observing the lack of facilities he suggested a consultation with Dr. Priestley, from the Institute of Tropical Medicine at Townsville who happened to be in Sydney. At this conference a course of three months' treatment was outlined and the following proposals made:

Either (1) set apart a special ward for malarial patients in a general hospital,

or (2) send such cases to Townsville,

or (3) equip a hospital in Sydney for military and naval cases.

No action was taken on this by the Navy but military cases were afterwards sent to Townsville.

In the *Encounter* in 1915 there occurred a few cases of gastrointestinal disturbances ascribed to tinned food, some of which was therefore condemned. In the *Una* in 1918 in the Islands precautions had to be taken against dysentery, which was very prevalent on shore. All drinking water was boiled and all uncooked greens and fruit scalded. No

cases appeared.

Epiphytic skin diseases were prevalent in all ships serving in the tropics, especially "dhobie itch" (*tinea marginata*). Pemphigus contagiosa also gave a little trouble in the *Fantome* in 1915. In

Dhobie itch

the *Sydney* in the West Indies also both dhobie itch and prickly heat were a source of annoyance. In July 1916 the *Melbourne* reported a small outbreak at Bermuda of a disease which the medical officer described as impetigo bullosa; it was most contagious, 90 cases occurring in four weeks. The symptoms

Impetigo

were a crop of small blisters varying in size from a pea to a pin's head, affecting usually the axilla. The irritation was intense but there was no fever or other con-

⁴⁰ In general in the R.A.N. quinine prophylaxis was practised. Some medical officers expressed a strong preference for hydrochlorate of quinine instead of the sulphate commonly used in the Navy. It was difficult to get the men to take the drug as a prophylactic. One M.O. opposed its use in this way, contending that it did not prevent the disease, but masked the symptoms, and that when the disease subsequently occurred the parasite had established in itself a resistance to the drug.

stitutional sign. The blisters were confined to the outer layer of the epidermis and left no trace when they burst. The fluid contained streptococci.

In these skin troubles the adoption of cotton underwear by men in the *Melbourne* (on the advice of her M.O. in 1915) instead of the service flannel, the wearing of which had been so insisted upon by the authorities in the past, was a useful step. Incidentally, cotton was more easily washed than flannel, no small advantage in view of the lack of laundry facilities and the restricted supply of fresh water.

At Singapore the destroyers were troubled by an affection of the external auditory meatus, known as "Singapore ear". This caused an acute swelling and ulceration of the lining membrane, leading in some cases to complete occlusion. Due to fungus, it readily yielded to syringing with boracic lotion and the instillation of 5 per cent. solution of salicylic acid in alcohol.

In the *Psyche*, in 1915, infestation by the *ascaris lumbricoides* was common, the patients usually having their attention called to their condition by vomiting the worm when they were seasick.

Ascaris lumbricoides The exhibition of santonin, with or without a purge, removed the parasite.

An unusual accident occurred when a boy from a destroyer was bitten on the thumb by a water snake when cleaning out a skiff. The poison was very rapid in its action; within two minutes the patient had a gland in the axilla the size of a pigeon's egg. The coxswain had placed a ligature round the arm, and the medical officer scarified the bite, applied potassium permanganate, and gave a hypodermic injection of strychnine. Fortunately no fatal result ensued.

The larger ships were seldom on the temperate part of the Australian coast, but the climate there naturally favoured the health of their men. The *Encounter* returning to the Australian patrol after a period in the tropics took advantage of this benefit in May 1916 to harden up her company. A series of endurance marches was started, from Fremantle to Perth and back, about 24 miles. Four hundred and seven men out of 420 took part, each party in charge of an officer. The winning party did the distance in 5 hours 45 minutes, its condition at the finish being excellent—only two members had slight foot trouble.

On the Mediterranean station the surroundings for the destroyers were much more favourable than in the tropics.

Ships and hospitals of the Royal Navy were available for the treatment of patients, the hospital in Malta especially being freely used. Patrols were shorter and therefore fresh provisions could be obtained more frequently and the men had more opportunity of playing games on shore.

**The
Mediterranean**

The experience of the *Brisbane* here, referred to later in this chapter, showed that quite apart from its use as a counter-measure to infectious disease, the practice of placing men ashore if possible during a refit was most salutary, especially when the crew had been long confined to the ship.

The North Sea, in which the *Australia* arrived at mid-winter 1914-15 brought at first a crop of medical problems in the matter of respiratory tract infections which, however, were overcome in a remarkable way as the men became acclimatised and the needs for ventilation were met. At first where arrangements were made in ships for heating the air supply it was sometimes found that men would turn on the heaters and render the air too hot and dry, headaches and sore throats resulting. But as soon as steps were taken to lock the valves and attention paid to keeping the living spaces at a regular moderate temperature, a great improvement was effected. The *Australia's* sick for the four quarters of 1915 numbered 303, 210, 166, 93, the large total in the first quarter being due to measles, influenza, and catarrh. The healthy condition in the last quarter was attributed, firstly to acclimatisation; secondly to ventilation, in particular the provision of light-tight wind-scoops; thirdly, to regular spraying and fumigation of living spaces, and disinfection and airing of bedding.

The change to cold after the heat of the tropics harmed neither the complement of the *Australia* nor those of the *Sydney* and *Melbourne* when these arrived in October 1916.⁴¹ On the contrary, their general health improved. It is true that every winter the Australian ships spent in the North Sea

⁴¹ The effect however, appeared to be different in the case of a draft of 58 ratings, 48 boys, 5 ordinary seamen and 17 second-class stokers—which left *Australia* in summer and arrived in the North Sea in mid-winter. Many had colds on arrival and a number immediately went on the sick list with catarrh or tonsillitis. Many of the boys were very small. In the words of the S.M.O. "it was obviously a most unfortunate time to choose".

coughs and colds were prevalent, but the men's physique was good and very few cases of serious pulmonary disease appeared. In the *Melbourne's* first winter in the North Sea tonsillitis caused a greater loss of service than anything else, the cases occurring in March, April and May.

In 1917 the squadron to which the *Sydney* belonged was kept at short notice and did a great deal of sea-time; it was not until nine months after she had joined the Grand Fleet that three days' leave were given. As the year went on confinement to the ship caused the men to grow mentally stale and irritable, but the light cruisers were then given a good spell of leave with the result that, the men being also acclimatised, they remained healthy even through the cold months at the end of the year. In 1918 apart from influenza, the *Sydney* was exceptionally free from disease and, in general, health was very good.

In northern waters the main troubles were the infections brought from the shore—especially measles, rubella and mumps—to which the Australian-born members of the service, reared in their open cities and country, were peculiarly liable. Ships on the Australian coast were not free from these diseases but they were less virulent and did not spread so easily. The difficulties of the medical officer in dealing with the epidemics in the North Sea were not lightened by the fact that the ship frequently spent days at sea under war conditions, with the prospect of action at any time. A note in the diary of the *Australia's* S.M.O. gives some indication of the responsibility he carried. "Returned to port last night. To-day sent 16 cases of measles to Linlithgow Fever Hospital. Sixteen ratings out of a ship which must be ready to go into action at any time, when every man is of value!"

When the *Australia* was at Plymouth after arrival in England a case resembling measles broke out. It was sent to the naval hospital and diagnosed as scarlatina. No second case occurred until March 29th; between then and April 5th four were sent to hospital. The last appeared on July 27th following a leave period. The disease was rife on shore and the S.M.O. ascribed the infection either to civilian workmen who came on board, or to the many knitted articles sent to the men.

Meanwhile on February 18th measles broke out lasting until March 29th. The cases were not numerous but made up for this in gravity; 21

occurred, 20 of the patients being born Australians of whom two died from pulmonary complications. The disease was of a more severe type than usual, and a senior medical officer was sent from the Admiralty to report and advise. The measures already taken extended, more especially in the daily examination of the whole ship's company, the disinfection of all mess utensils and glasses in the canteen, and greater attention to the ventilation and warming of the ship. The S.M.O. was sent on sick leave at the end of March and a Senior Fleet Surgeon sent by the Admiralty took charge. He remained after the S.M.O.'s return and the two officers issued a report on the epidemic.

A second epidemic, apparently introduced by a patient returned from hospital, occurred from May 10th to June 15th. In this 38 cases occurred but all were very mild, the change being possibly due to the weather having become finer and warmer, and to the energetic ventilation and disinfection of the ship. Again 33 of the patients were Australian born. Seven of the patients in these epidemics were afterwards invalided to Australia on account of debility, it being considered that they were unable to stand the climate.

In the *Encounter* cruising in the Pacific in 1915 a case of measles occurred four days after leaving Sydney. Between July 25th and August 11th five more appeared. The patients were isolated on the cable deck, their mess and the sick bay fumigated, and possible contacts examined daily. The disease was very mild.

When the *Brisbane* refitted at Malta in 1917, measles was rife amongst the children on shore and spread to the ship. In this case the outbreak was dealt with by most effective method—by arrangement with the Naval Chief of Staff, the whole ship's company went into camp from March 28th to April 11th while all living spaces in the ship were thoroughly fumigated with formalin. This work occupied a week, each space being closed for twenty-four hours after spraying. In the following week the whole mess deck was painted out, so that the men returned to a clean ship. In camp only one case of measles appeared.

Both the *Sydney* and the *Melbourne* on arriving in the North Sea at the end of 1916 experienced outbreaks of measles and rubella, in which the Australian ratings again showed their liability to infection, especially in the cold and dull winter months. The fighting efficiency of the *Sydney* was threatened by the number of cases of rubella sent to hospital and, therefore, absent from the ship for a fortnight or more. In view of the extreme mildness of the cases it was suggested that they might be treated on board, so as to be available, if necessary, to go into action. After consultation with the S.M.O. of the squadron this course was approved and was followed at the end of 1916.

The ship placed in quarantine, was available for duty with her squadron. Fifty cases occurred in six weeks. A space was isolated and all patients placed in it. They were anointed all over with carbolic oil, 1 in 60, and given an antiseptic bath every day. The ship's company was inspected daily, all messes liberally treated with disinfectant, and all mess utensils disinfected twice daily, clothing and bedding also being frequently disinfected. Each case was isolated for five days until the rash and all discharges had disappeared. A bath of hyperchloride of mercury,

Measles

Rubella

Retention on board

1 in 3,000, was then given, the patient's clothing and bedding put through the disinfectant, and the patient himself sent to duty. This was a great saving of time, since hospital meant a minimum absence of a fortnight. No spread of the disease could be traced to cases treated in this manner.

In the *Melbourne* also a small outbreak of rubella occurred at the end of November 1916, lasting till January 27th; 20 cases were reported, all young Australian ratings. Upon the Rear Admiral's order that no more were to be sent to hospital, one patient was kept and treated like the *Sydney's* men except that he was kept for ten days in isolation. No more cases occurred.

In 1918 rubella occurred among the boys and ordinary seamen in the *Australia*. For ten weeks the ship was quarantined and patients sent to hospital but kept there only for nine days—a great improvement on 1915.

During 1917 the health of the *Australia's* men improved—there were no epidemics though a few cases of mumps, rubella, and scarlatina occurred. The S.M.O. emphatically endorsed the policy of keeping a man in the sick bay when slightly ill rather than waiting for him to become really bad. Though this increased the sick list the men's health was actually better.

Medical officers of the Grand Fleet constantly feared the introduction of cerebro-spinal fever into the ships. A few cases occurred in the depots at Chatham, Portsmouth and Plymouth, and drafts from there were kept under close surveillance in an isolated mess and had daily throat sprayings of a 1 in 250 solution of permanganate of potash. No case occurred in the *Australia*.

Mumps appeared chiefly in Australian and European waters. In November 1916 an epidemic in the *Encounter* was traced to Sydney.

The ship was able to discharge patients to hospital at Fremantle and Albany and with the usual precautions, overcame the epidemic by 8th March 1917.

The *Sydney* had a few cases in the West Indies but in English waters matters were more serious. *Australia* had 79 cases in the first half of 1916 (especially in April). In the spring of 1918 *Melbourne* had 29 of a severe type, 24 being among Australian ratings.

At the beginning of the war while in the Islands in September and early October the *Australia* had a small epidemic of mild "catarrhal influenza"—166 cases, but the days' service lost was only 497. The source of infection was not known.

The *Encounter* had suffered a similar epidemic with 93 cases, beginning at Palm Island on July 25th, after a visit to Port Moresby, and lasting till August 21st. Her medical officer wrote; "There had been no leave since leaving Sydney on June 16th—36 days before the first case—with the exception of a few hours at Port Moresby. There was no epidemic of any sort at Port Moresby during our stay; but a week after we left influenza broke out among the natives. Apparently it was of a severe type as there were some deaths." From a clinical standpoint the cases were very similar in both ships.

On the East African coast early in 1915 the *Pioneer* suffered an epidemic of mild influenza, the infection apparently coming from H.M.S. *Hyacinth*; 35 cases occurred in the *Pioneer's* complement which averaged 226.

In Malaysia in 1916 both *Psyche* and *Fantome* had epidemics. That in the *Fantome* broke out at sea; its source could not be traced. Her accommodation and the energies of her M.O. and sick-berth attendant were severely taxed. The general health of the ship's company, which had already suffered somewhat through the climate, was lowered.

In the *Psyche* between June and October 1916 there occurred 40 cases of "influenza of a peculiar type". The onset was very sudden and was characterised by a rigor with a small pulse of low tension. This gave place in half an hour to hot dry skin, rapid bounding pulse, intense frontal headache, pains in the limbs, joints, epigastrium and eyes, with a rapidly rising temperature. For 24-48 hours patients complained of these symptoms, which were accompanied by nausea and vomiting, soreness of the eyes and extreme prostration. The temperature rose to 105, the face was flushed, and there was congestion of the conjunctiva and lacrimation. Rigidity of the abdominal muscles was noted, the tongue was very foul, and obstinate constipation was invariable. On the third day the symptoms began to abate and, at this stage, a cough, with thick copious sputum developed. The patient was allowed up in eight or ten days and resumed duty in about a fortnight. One case resulted fatally from pneumonia and two others were subsequently invalidated for a toxic myocarditis with mitral regurgitation. The medical officer stated that the epidemic was coincident with a pandemic of influenza throughout Australia, U.S.A., China and Malaya.

In British waters in February and March 1915 the *Australia* had 115 cases of mild catarrhal influenza, doubtless due to the unaccustomed cold and damp; 91 were among Australian ratings. The symptoms were mainly those of respiratory catarrh, and the duration only averaged 3·3 days. Only eighteen cases of pneumonia were recorded, half of them during the first quarter of the year; 13 were among R.A.N. ratings of whom two died. The usual mild outbreak occurred in the following winters.

In 1918 there was a very different tale. Influenza ravaged the Grand Fleet and the inhabitants and the Australian ships there suffered with them.

The *Australia* had two epidemics—one in May and the other in November and December. The first comprised 140 cases of a mild character, the average stay on the sick list being 2·6 days. The second lasted from November 22nd to December 6th, and was more severe, the temperature often taking four to six days to subside, and leaving greater prostration.

The *Sydney* experienced three outbreaks—the first from April to May, with 69 cases; the second very short and sharp, 265 cases between June 25th and July 12th; the third, in October and November, 35 cases.

The *Melbourne* reported one epidemic, June 27th-July 10th. There were 157 cases, none complicated and the acute symptoms rarely lasted more than two days, though the subsequent prostration was marked.

In Australian waters the *Brisbane* did not escape the first epidemic of 1918. During September 15th-30th, she had 43 cases, with an average stay on the sick list of 2·8 days. The ship was then sent to Great

Britain. On the way, between mid-November and December 19th while with the destroyers in the Mediterranean Fleet she had a much more severe outbreak of 183 cases. Of these, 23 were sent to hospital, where two died of pneumonia. In four others pneumonia occurred.

Among the Australian destroyers in the Mediterranean a mild influenza had appeared in the second quarter of 1918; but in the third quarter, the *Huon* and *Torrens* then refitting at Genoa suffered severely, four men from the former and an officer from the latter ship succumbing to pneumonia. The severity of the attack was ascribed to the ship's being in dock in cold weather, which rendered it difficult to keep the mess decks clean and necessitated the stowing of a good deal of clothing in the living spaces. The difficulty in keeping these spaces warm also led to the shutting of scuttles and other air inlets.⁴²

Like the *Brisbane*, the *Encounter* in Australia (at Fremantle) during the last quarter of the year had 74 cases, all mild. She finished that year's work by carrying a medical relief expedition to the Tongan and Samoan Islands, which were in the grip of a deadly outbreak.

In November 1918 at Suva in Fiji the *Fantome* suffered a violent outbreak of 72 cases, several with lung complications. In eight cases relapse occurred, but no deaths resulted though several Europeans on shore died despite their better conditions of living. The saving factors were considered to be:

1. The early isolation and treatment of the cases.
2. The prophylactic measures adopted.

The latter consisted in a lecture to the men on the disease and its symptoms, with instructions to report themselves at once if they felt ill; and daily compulsory nasal douching and gargling with an alkaline antiseptic lotion under the supervision of the M.O.

The group of diseases that caused the greatest loss of service was the venereal, especially gonorrhoea. They prevailed in both temperate and tropical climates, but in tropical conditions were more severe and refractory. Chancroid was particularly prevalent in the *Psyche* when on the coast of Burma and was usually complicated by bubo.

The routine treatment of syphilis by arsenical compounds was difficult and blood examinations were only occasionally possible. For ships in the North Sea, hospital ships and shore hospitals carried out the tests and treatment; but this meant men's being absent from their ships for forty-eight hours. Before the war Staff-Surgeon Caw of the *Australia* had urged that the necessary apparatus for carrying out salvarsan treatment on board should be supplied to him. This was not favoured

⁴² This emphasises the advantage of removing the ships' companies from their ship when in dock and taking the opportunity to thoroughly cleanse, air, disinfect and paint out the living spaces, which easily become infected, but are not so easily disinfected.

by the Admiralty who, in view of the risks attaching to this treatment, preferred that all cases should be sent into hospital. However, just before the outbreak of war a still and other apparatus were supplied to the ship and were of great use during her long voyages from the Pacific to the North Sea.⁴³

Gonorrhoea caused enormous loss of service, but no new methods of treatment were discovered to shorten its course. The ships were all fitted with troughs for treatment by irrigation, and this method was generally favoured by M.O's.

As the war progressed the incidence of venereal disease lessened considerably. Apart from the few opportunities for infection, the decrease was ascribed by most medical officers to the greater attention paid to the lectures on venereal disease and general hygiene given by medical officers, the use of prophylactics supplied free, and latterly, for the ships with the Grand Fleet, the use by the men of the A.I.F.'s blue light stations in London.

In addition frequent inspection of the ships' companies by the medical officer, and the punishment of those found concealing disease, caused infected men to report as soon as possible and obtain early treatment.

At the start of the war the absence of the squadron from port, especially from Sydney, reduced the incidence of fresh cases almost to nil. In the *Brisbane* in 1917 the incidence of venereal disease, which had never been large, was during the last quarter reduced to nil. This is remarkable because the ship had just previously spent some time in Fremantle, where leave was freely given.

In the Pacific, the *Encounter* in 1915 suffered mainly through gonorrhoea, of which 57 cases occurred. They formed 17 per cent. of the sick list, and were all treated on board, the average duration treatment on the attending list being just over a month. In the *Fantome* that year, apart from chancroid, venereal disease was slight considering that the ship spent a fortnight in two Eastern ports after long periods at sea.

The *Una* in the year October 1916-17 was almost completely free from venereal disease, only two cases of gonorrhoea appearing in December, when the ship was refitting in Sydney; but after leaving that port there was very little opportunity of infection. In the *Encounter* in 1917 the incidence was comparatively low owing to the precautions taken by the men themselves, and the prophylaxis organisation on board. Even after a visit to Tahiti, where the disease is very prevalent, only two cases resulted, and these men had taken no steps to prevent infection.

⁴³ Salvarsan being a German preparation its supply rapidly failed and the substitute, galyol, did not prove satisfactory. It was not until Nov-arsenobillon was obtained that arsenical treatment again became effective.

On the *Psyche* which spent most of 1917 in her cruising ground on the coast of Burma, influenza, chancroid and gonorrhoea were responsible for the greatest loss of time and efficiency.

In the *Pioneer*, after a visit to Simonstown, Cape Colony, in September 1915 to dock and refit, venereal diseases became prominent, the cases being discharged to the Royal Naval Hospital there.

South Africa During 1915 the *Pioneer* had 92 cases of venereal disease on the sick list, with a loss of 411 days' service.

In the West Indies where the *Sydney* and *Melbourne* served in 1915-16 the negroes were reported to be badly infected with venereal disease. At Kingston, out of 120 negroes who presented themselves as recruits in one day, 80 were found to be infected. Venereal disease caused the greatest loss of service during the year in the *Sydney* and at the end of the year the medical officer wrote that it "still gives much trouble. Men repeatedly get infected in spite of lectures and threats. Every case is now given two months' stoppage of leave, and repeated cases are punished by warrant".

West Indies

Halifax

On the other hand Halifax, so far as concerned these diseases, was a clean port.

In British waters leave periods always produced their crop of venereal diseases though not always a heavy one. It was indeed noted in 1917 that their incidence, even after leave was comparatively small, a result attributed in a great measure to the use of the treatment "booth" at the A.I.F. Headquarters in London, which the D.M.S., A.I.F., Sir Neville Howse, made available to sailors.

United Kingdom Minor injuries were common but did not lead to much loss of service. Coaling ship, however, gave rise to injuries sometimes severe and occasionally fatal. Carried out, as it often was, immediately on arrival in port by crews already fatigued it was surprising that it did not cause more accidents.⁴⁴

Accidents

Before the war no organisation existed for the dental treatment of officers and men of the R.A.N., though the importance of dental hygiene in preventing disease was recognised by the medical officers.

Dental treatment During the war efforts were made to provide dental treatment as opportunities allowed. Thus in 1915 before the *Encounter* reached Singapore her M.O. examined the teeth of the ship's company. He found at least fifty ratings who required immediate attention, and on reaching port arranged a contract with a civilian dentist on shore to carry

⁴⁴ It is not the least of the advantages of oil fuel that it does away with this arduous task. Oiling does not involve dust; ports and hatches can be left open so that the ventilation of the ship is not interfered with; and, as no subsequent washing down is necessary, the decks can be kept dry, an important matter for the health of the crew.

out the work. Military dental establishments and the dental hospitals in Sydney and Melbourne helped greatly.

In 1916 Staff-Surgeon Caw proposed that dental surgeons should be sent afloat in the proportion of one to every three big ships and one to every six light cruisers, but it was not until 1918 that a dental surgeon was appointed to the *Australia*, a surgery being fitted out in the superstructure. This was the commencement of the dental service since organised.

Early in the war steps were taken to guard against the fumes from bursting shell or burning cordite and in 1918 also against poison gas in either cloud or gas shell.

**Protection
against gas**

The Admiralty's early mask was a folded strip of black net, in which was enclosed a pad of cotton wool kept damp with a solution of sodium sulphite. This was found seriously to interfere with respiration. Accordingly in the *Australia* an ingenious apparatus was designed and made, its main element being a milk, cigarette or tobacco tin with one end perforated. It was filled with charcoal or tow saturated with a 3 per cent. solution of sodium sulphite. A face-frame of lead wire was connected to the tin by four copper struts, the space between tin and face frame being covered with an impervious rubberised material. All the materials existed in the ship but unfortunately there was only enough lead wire to make 200 masks. These were issued to the stoker fire brigade who were most likely to need them in action. Later a box respirator and an anti-gas helmet, with nose-clip and rubber goggles were issued.⁴⁵

The problem of preventing the ingress of gas and of freeing the compartments when once filled, was met by arrangements to shut off certain supply fans and to turn on certain exhaust fans, doors and hatches being opened to draw the gas into spaces from which it could be cleared.⁴⁶

In October, 1918, the S.M.O. of the *Australia* and other officers from the Grand Fleet attended a Gas Course organised by the military authorities.

⁴⁵ The nose-clip, however, was found uncomfortable, the goggles did not fit everybody, and the rubber valve unless constantly examined was apt to stick.

⁴⁶ Arrangements to cover the mouths of supply pipes with screens of gauze moistened with sodium sulphite proved unsatisfactory.

The establishment of medical officers and sick-berth staff was not nearly sufficient for war and it was necessary to enter medical officers and hurriedly train sick-berth attendants, who, though enthusiastic, **The medical staff** were at first handicapped by their lack of knowledge. The need of a reserve of medical officers and sick-berth staff trained in peace-time was sorely felt.

On demobilisation after the Armistice, most of the temporary medical officers returned to civil life but they left behind them in their official journals and reports a record of work which showed a high standard of professional intelligence and enthusiasm. The reserve medical officers proved most valuable auxiliaries, and handled the service problems with which they were faced in a way that was only made possible by the experience gained by them in time of peace. The permanent medical officers, the pioneers of the R.A.N. Medical Service proved, despite their short pre-war experience, entirely equal to their task of maintaining the Navy's health often under very adverse circumstances. Their reports show that the sick-berth staff, though insufficient in numbers, worked generally with a loyalty and devotion worthy of all praise. In all, the medical staff set a tradition that ranked it high with the other branches of the R.A.N.

VI

THE HOSPITAL SHIP *GRANTALA*

Before the war the Admiralty had, as part of its scheme of mobilisation, arranged for the fitting out in Australia of a merchant vessel as a hospital ship for the Pacific Fleet and to this end had provided iron swing cots, bedding, crockery and medical stores with machinery for a laundry. These were stored at Garden Island and had been taken over in July, 1913, by the Commonwealth Government. Thus when war broke out Australia was able to proceed with the equipment of a hospital ship to attend on the Australian Squadron. The ship chosen was the *Grantala*, a passenger vessel of 3,655 tons belonging to the Adelaide Steamship Company.

The Music Room, 1st Class Saloon and Nursery Saloon were cleared and fitted with iron swinging cots, bunks being

made on the settees. These made three forward wards. Cabins with their doors and wash basins⁴⁷ removed were each to accommodate two patients, preferably convalescents. The upper decks, provided with iron cots and with screens rigged out-board, made open air wards, useful for warm climates. An infectious ward was built mainly with canvas on the poop, and fitted with iron cots. In emergency canvas cots also could be slung from two parallel wooden bars. The canvas roof was not always weather proof.

The 2nd saloon became a receiving room and lecture room but could be rapidly fitted as a ward of forty cots. In its corner was a wooden X-ray room.

The operating theatre was built of steel over the hold on the after well deck, and was as well furnished as any operating theatre ashore. Patients were admitted to it from the receiving room through a door cut in the bulkhead. Aft of it was a ward where the more serious cases would remain till operation after which they would be removed to a general ward. Aft of this again was a lift for lowering patients to the deck below where they would be transported by wheeled trolley to the wards forward.⁴⁸ The floors of the wards were painted with brown shellac, a satisfactory method. The laundry, steam disinfecter, and steriliser were conveniently placed between decks in No. 2 hold, immediately forward of the wards.⁴⁹

For ventilation, electric fans were provided in the wards and wind scoops were fitted to the portholes. In sanitation the guiding principle was to have a dry ship.⁵⁰ Wet portholes, dripping taps, clogged discharge pipes from lavatories, leaky skylights and decks all needed immediate attention. Besides the ship's carpenter a naval carpenter was carried and also a naval plumber and an ample supply of timber. The W.C. pans did not receive enough water, being old and the water inlets often clogged.⁵¹ The W.C. accommodation though suf-

⁴⁷ It was feared these would be used as sinks. The bulkheads were left.

⁴⁸ A lift was not necessary in the fore part of the ship as the staircase there was broad with an easy gradient.

⁴⁹ The wards, too, were fitted with electric sterilisers and also with cupboards and mess tables. A store room for patients' effects was provided and kept under lock and key. One hold was reserved, under lock, exclusively for medical stores.

⁵⁰ Unfortunately the ship was ballasted with earth which was constantly damp, harbouring swarms of cockroaches.

⁵¹ This probably due to the fact that the ash ejector was fitted with a shoot which discharged the ash close to the inlet of water for the W.C's.

ficient was inconvenient as far as the patients were concerned and the Principal Medical Officer suggested that a new place should be built for convalescents handy to the wards but separated as far as possible from the quarters of the ship's crew.

It was found necessary to separate the lavatory accommodation of the sick-berth staff and the ship's stewards as when they were together in the second class men's accommodation they quarrelled and the place was always dirty. The wash places for the sick-berth staff were merely supplied with perforated iron shelves into which basins were fitted. This was unsatisfactory and could have been made an excuse for lack of cleanliness.

On the main deck forward and aft two sanitary wash places for the cleansing of bed pans and urinals were erected close to the ship's side in the open air.⁵²

The water-supply furnished a difficult question. The *Grantala* could carry 400 tons of water in tanks, but could only condense five tons a day, which was practically used by the boilers. In peace-time runs some tanks had occasionally been filled with salt water for ballast, and the cocks leading to them now sometimes leaked admitting salt water. The daily consumption was from 10-12 tons. At Suva, Fiji, a good supply was always assured; but had the ship gone to some parts of the Pacific the problem would have become grave. A condensing plant sufficient for ample supply was really essential.⁵³

The food supplied in the *Grantala* was generally speaking good, the shipping company being responsible except for certain medical comforts. A system of daily medical inspection of all food for the use of the hospital and staff was instituted with great advantage and although occasional complaints were received from the sick-berth staff they were on inquiry found to be trivial and were easily rectified. The hospital dietary was ample and good. Diet sheets were made out in the wards in

⁵² They were constructed of iron and supplied with water by rubber hose pipes connected with the service for washing the deck

⁵³ The water-supply to the laundry furnished a problem. The P.M.O. recommended that it should all pass through one tap that could be locked. For economy, a responsible man filled the tubs and then turned off the water. A water meter would have been an advantage, as the ship's officers tended to blame the laundry for excessive use of water.

the usual way and not one complaint about the food came from any patient.

The hospital was staffed by a P.M.O., Fleet Surgeon W. N. Horsfall, Royal Naval Reserve, six surgeons, a consulting surgeon, chaplain, matron, six nursing sisters, Chief Sick-Berth Steward, R.N. and men selected largely from the Ambulance Brigade in Sydney with one Inspector of an Ambulance Brigade Division. The men were volunteers without experience in nursing⁵⁴ beyond their training in the brigade, but they were eager to learn and soon became very reliable.

For the transport of sick and wounded naval canvas cots were provided which, when necessary, could be placed into a wooden tray fitted with slings and so hoisted in or out of the ship. The men in charge of the ship's steam winches and derricks could, from long practice, lower these without any jarring. For transport across water the ship's lifeboats were used.⁵⁵ Seven lifeboats were available for transport, each having a ship's officer, a medical officer and attendant⁵⁶ and

⁵⁴ Naval nursing sisters and sick-berth staff had been sent out from England but arrived at Fremantle after the *Grantala* had left Sydney and were therefore sent back.

The surgeons who sailed in the *Grantala* were all recommended by the Deans of the Medical Schools of Melbourne and Sydney. The matron was selected by the Dean of the Medical School of Sydney in conjunction with the matron of the Royal Prince Alfred Hospital, who subsequently appointed the nursing sisters from the same hospital. The fact that matron and sisters came from the same hospital was a distinct advantage.

⁵⁵ By strapping a boat's oars fore and aft along the thwarts and covering them with mattresses patients could be more quickly moved than in cots. Manhandling had been generally favoured by medical officers of ships and the method practised by the sick-berth staff of the *Grantala* for moving those whose condition allowed it was as follows:—Two men kneel on the right of the patient, opposite his shoulders and hips respectively. They then place their arms beneath him, lift together and by a gentle movement of the arms cause the patient to lie on the right side with his chest against the chest of the first man and his hips against the chest of the second. In this position a patient can be carried a considerable distance.

⁵⁶ The surgeon and attendant each had a first-aid dressing bag containing twelve Spencer Wells forceps, morphia, chloroform and iodine. Ample spare dressings and splints were placed in each boat.

It was intended that the surgeons should use rubber gloves on this duty and a large supply of thick post-mortem gloves, which could be easily put on or taken off, were carried. The attendant carried an enamelled bucket to hold a strong solution of biniodide of mercury so that the simple rinsing with the gloves would render the surgeon's hands safer for introduction into a wound.

This organisation was tested by drill. Fifteen of the sick-berth staff represented the wounded, each bore a label with name, rating, and the nature of a supposed injury. They were then sent aboard a transport in harbour and each lay down in any part of the ship he chose. On a signal being given, the lifeboats were towed to the transport, the patients transferred to them either by manhandling down a gangway or by being lowered in a cot. At the hospital ship the purser and clerk entered the names, ratings, distinguishing marks into a general entry book; the consulting surgeon sifted out the more serious cases for operation; and the patients were conveyed to the wards by manhandling or on trolleys. Though it was not expected that this organisation would be wholly possible under actual war conditions it formed a basis that could be modified, and the drill created a great deal of interest and gave the men exercise.

two seamen on board. They were towed in a line by a motor boat under control of the Chief Officer who was responsible for all transport arrangements requiring his professional knowledge.

From September to December 1914 the *Grantala* moved from base to base in accordance with the naval requirements, her itinerary being Sydney to Townsville, Townsville to Rabaul, Rabaul to Suva, Suva to Sydney.

Except for about a dozen casualties received on board as the result of operations at Rabaul, her work was that of a hospital ship in peace-time. Sick were received from the fleet and transports, including about fifty cases from the French cruiser *Montcalm* with dengue fever.

About a hundred operations were performed on board during her four months of active service. In a hired merchant ship hastily fitted, many difficulties naturally arose. The chief ones were connected with the administration of the personnel, and were enhanced by the fact that except the P.M.O. and one chief sick-berth steward the hospital personnel was composed of civilian volunteers with no previous experience or training in the needs of discipline. The surgeons, in compliance with instructions issued by the Admiralty in peace-time, were enlisted as civilians and not commissioned. This would not have mattered had they been required to act as auxiliaries to a naval crew but the volunteer sick-berth staff regarded them as passengers. The P.M.O. rectified this by putting them into improvised uniforms and authorising them to act as commissioned officers, but much "moral damage" had already been done.

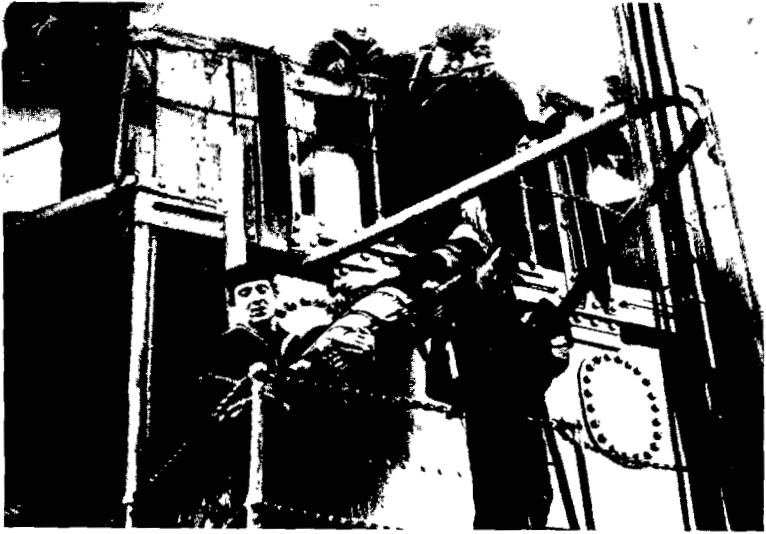
The sick-berth ratings at first proved difficult to handle, some of them refusing duty on the day after commissioning saying that they had volunteered to nurse the sick and wounded and not to clean paint. This attitude was mostly the result of their complete ignorance of the duties of the rating for which they had volunteered. It changed at once when it was pointed out that if they persisted there was no alternative but to send them back to Sydney in disgrace to undergo court-martial. In time, with training, they learned that it was only under organised disciplinary control that the machine would

run smoothly, and their general conduct became very satisfactory.

It was, however, unfortunate that the P.M.O., already harassed by numberless difficulties of rapid organisation, should be exposed to the vagaries of a wholly untrained staff, when with forethought officers and men could so easily have been trained for this in peace. On the other hand a naval hospital ship, consisting as it does of a naval hospital carried in a merchant ship, necessarily provides, in its dual control, problems that can lead to friction, especially when the crew claims privileges under an industrial award granted by an Arbitration Court in times of peace. It was due to the cordial and tactful co-operation of her master and the P.M.O. that the few difficulties that occurred in the *Grantala* were surmounted without undue trouble.

With the departure of the *Australia* on her chase across the Pacific and the dispersal of the Australian Squadron, the *Grantala's* usefulness waned. On her return to Sydney she was handed back to her owners.⁵⁷

⁵⁷ This record has been chiefly based on the report of Surgeon Commander Horsfall. For other details see his article on "Converting a merchant vessel into a hospital ship at a time of emergency", *Journal of the Royal Naval Medical Services*, No. 2, Vol. X, Apr., 1924. An excellent account of nursing in her is given in *In Grey and Scarlet* by Miss R. A. Kirkcaldie.



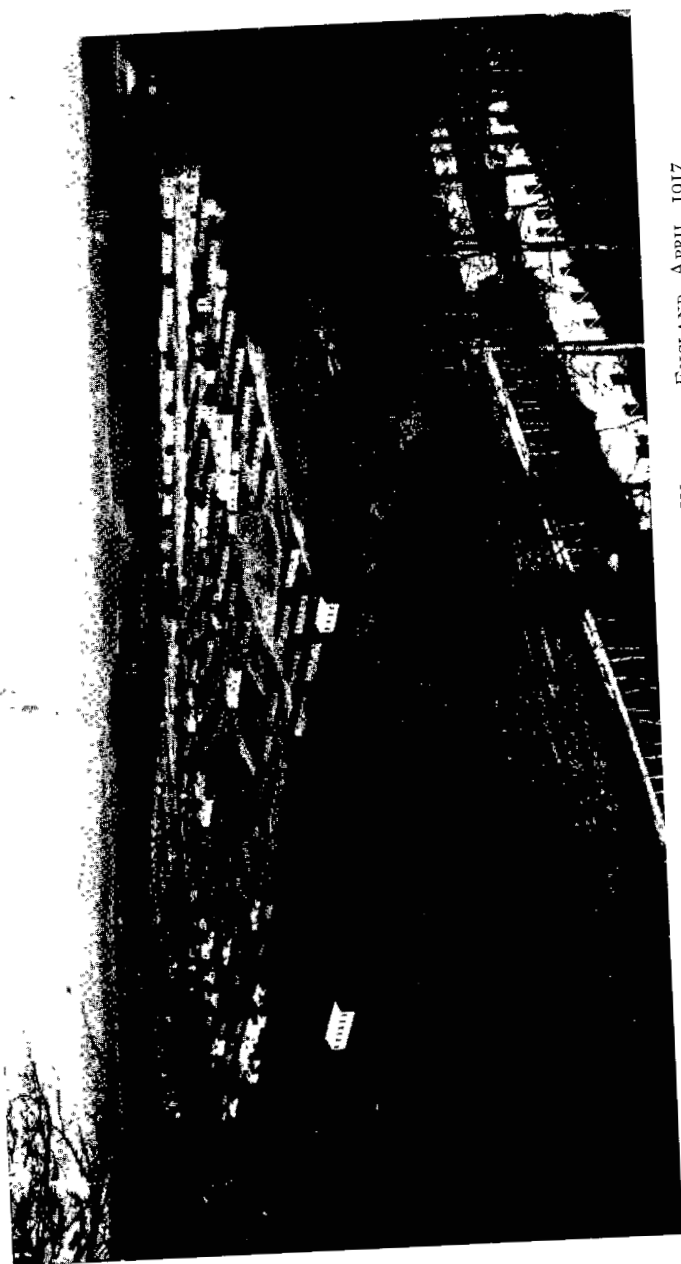
12. METHOD OF USING THE NEIL ROBERTSON NAVAL STRETCHER
First aid drill on H M A S *Australia*

Associated News Photo
Aust War Memorial Collection No EN547



13. THE SICK BAY OF H M A S *Melbourne*

Photo lent by Surgeon-Captain E T P Eames
Aust War Memorial Collection No A1930



14. THE AUSTRALIAN FLYING CORPS TRAINING DEPOT, WENDOVER ENGLAND, APRIL, 1917

To face p 405

Aust. War Memorial Official Photo No D875

CHAPTER VIII

MEDICAL SERVICE WITH THE AIR FORCE

THE special medical service with the Australian Flying Corps—not then separated from the A.I.F.—began late in the first World War, and was limited in extent. Yet certain features render its history of great interest; to understand these it is necessary, very shortly, to recall the birth and growth of the British and Australian Air Forces.

The attention of the British Army turned to aeronautics in 1878, when a series of experiments with captive balloons were carried out. Kites also were used later and in April 1911 there was formed an Air Battalion of the Royal Engineers which developed into the Royal Flying Corps, created on 13th May 1912. Experimental work with airships and other forms of aircraft was also undertaken by the Navy. The British air services then comprised a Naval Wing, Military Wing, Central Flying School, Reserve, and Aircraft Factory. The Naval Wing (Royal Naval Air Service) was controlled by the Admiralty, the Military Wing (Royal Flying Corps) by the War Office. At the outbreak of war, the two wings had a total strength of 197 officers and 1,647 others. Six squadrons were being formed but all were under strength. On the declaration of war in 1914 the available personnel and material went to mobilise four squadrons. By April 1919 the R.A.F. comprised 27,906 officers and 262,842 others.

On 13th August 1914 four squadrons, comprising 56 machines, accompanied by an aircraft park, went to France and they played their part in the retreat from Mons. By November, 1914, six squadrons were in France, organised in two wings of three squadrons each. As more squadrons were sent to France new wings were formed. In January 1916 the 1st R.F.C. Brigade was established, comprising a Corps Wing and an Army Wing. From that time the brigade became the basis of the general organisation.

For two and a half years of the war the air services were developed largely by Navy and Army on parallel lines, the duplication causing unnecessary expenditure and confusion, competition, and delay in obtaining supplies. In February 1917 an attempt was made to remedy this by forming an Air Board, upon which the Admiralty and War Office were represented. The Board became responsible for designing and allocating aircraft and accessories, but the administration of the two services remained separate. This was an improvement but as there was still duplication of effort, the two air services were presently amalgamated.

A Secretary of State for Air was appointed on 1st January 1918 and the Army and Navy air services were fused together as the Royal Air Force on April 1st.

At first British air units had no medical officers on their establishments.¹ By 1917 however, the R.F.C. had grown to over 100,000 personnel, with a special organisation for Home Defence as well as for overseas service. It included technical and special units, schools, stores, depots and a great training organisation. Certain headquarters units and training establishments had then their own medical officer but each squadron still only one medical orderly.²

In Australia, in 1912, as part of her new army scheme, approval was given for starting a Central Flying School. This was placed at Point Cook, Victoria, hangars and workshops erected, and two flying instructors, four mechanics, and five aeroplanes obtained from England. The first course began on 17th August 1914, and training continued throughout the war. On 30th November 1914 the first Australian aviation unit left for German New Guinea, but it saw no service and returned to Melbourne early in 1915.

In February 1915 a request came from India for trained aviators for service in the Tigris Valley. Australia sent a half-flight—4 officers and 66 other ranks. It arrived at Basra in May and fought at Kut³ where part of it was captured. At the end of

¹ A squadron at first comprised 12 machines in three flights with 19 officers and 131 others, and 7 others attached including 3 medical orderlies for water duties, etc.

² Wing headquarters had two. Squadrons then had 18 machines in three flights with an establishment of 36 officers and 208 others and 23 personnel attached.

³ A loss was sustained to both the A.F.C. and the medical profession by the death of Lieut. G. P. Merz, a young medical practitioner of Victoria who was one of the first to qualify as a pilot in Australia. He made a forced landing in enemy territory and was killed by hostile Arabs on 31 July 1915.

1916, the remainder was withdrawn from Mesopotamia and sent to Egypt.

Meanwhile the first squadron of the Australian Flying Corps, formed in Australia in December 1915, arrived in Egypt on 14th April 1916. There it was broken up, and its three partly trained flights and its headquarters were distributed among the R.F.C. formations. On June 1st it reassembled as a squadron at Helopolis but till the end of 1916 the three flights worked separately with British squadrons. From then onwards it formed part of the 40th Wing, Middle East Brigade and played a very important and distinguished part in the Palestine operations.⁴

Its medical arrangements until October 1917 were entirely those of the R.F.C. within which it operated⁵ but an Australian medical officer (Captain J. R. Harris) was then allotted to it and remained until after the Armistice.

In 1916 at the request of the War Office made on the ground that "the Australian temperament is specially suited to the flying services", 183 members of the A.I.F. became officers in the British Flying Corps. In consenting to this the Australian Government offered a second Australian flying squadron. The personnel were assembled at Point Cook and sent to England for training under Australian-born officers of the R.F.C. It was also decided to form a reserve squadron to reinforce the two Australian ones. Further, in Egypt the nuclei of two squadrons were raised from the 1st Squadron A.F.C. and from the Light Horse and sent to England for training in the British training system. There the Australian Flying Corps was built up as part of the A.I.F. but operating within the British military system. In January 1917 Australia decided to send to England a fourth squadron after preliminary training at Point Cook.

On 28th December 1916 the first of these squadrons (originally No. 69 R.F.C., later No. 3 A.F.C.)—reached England. It

⁴In Sept. 1916, it was redesignated 67th (Australian) Squadron, R.F.C., but it resumed its original title, 1st Squadron, A.F.C., on 6 Feb. 1917. No. 1 Squadron sustained the following casualties in Egypt and Palestine:

Killed	..	..	..	..	..	..	19	officers	2	other ranks
Died	..	..	..	..	..	..	2	"	3	" "
Wounded	..	..	..	..	..	..	23	"	8	" "
Prisoners	..	..	..	..	..	..	12	"	—	" "
Invalided	..	..	..	..	..	..	24	"	60	" "

It flew 14,377 hours, dropped 68,282 lbs of bombs, destroyed 29 enemy aircraft and drove down 53.

⁵One A.A.M.C detail was, as usual, attached to it.

was quickly followed by Nos. 68, and 71 (later 2 and 4). No. 3 went to South Carlton (No. 23 British Training Wing), No. 2 to Harlaxton (No. 24 Training Wing), and No. 4 to Castle Bromwich (25th Training Wing). Each remained in training for about eight months.

To provide reinforcements, Australian training squadrons also were now formed in England—No. 29 Training Squadron (Aust.) R.F.C. at Shawbury and Nos. 30 and 33 at Ternhill, and No. 32 at Yatesbury. An A.F.C. depot for the training of mechanics and other specialists was established at Halton Camp. All squadrons were served by the British Army medical organisation each having only one A.A.M.C. detail attached for first aid and sanitation.

In September 1917 Nos. 2 and 3 squadrons went to France, followed in December by No. 4.⁶ They did not form a wing but were at first allotted to different British wings.⁷ Their medical arrangements were then the same as for the R.F.C.

The medical service was not much in evidence in the aerodromes at the front. For sick parades an R.A.M.C. officer from the wing attended if required. A corporal A.A.M.C., attached to each squadron with a small medical outfit, had been trained in first-aid and sanitation, and took the ordinary sick parades. Two motor ambulance-waggon were at each squadron of which one was always ready.⁸ For more skilled first-aid in the event of serious accidents the air force in the field looked to the nearest R.M.O. or field medical unit.⁹

⁶ One of the flight commanders in No. 4 was Dr A. H. O'Hara Wood, a medical practitioner of Melbourne. He was a member of the R.F.C., to which he returned in Feb. 1918. He died of wounds on 6 Oct. 1918.

⁷ Their administration, however, was conducted by an Australian officer (D.A.A.G., A.F.C.) attached to the Headquarters R.F.C. at St. Andr  e.

⁸ No ambulance planes then existed.

⁹ Like others, Australian medical officers and men had constantly to attend to airmen of their own side and of the enemy. The best known instance of succour to enemy airmen was that given to the Kaiser's nephew, Prince Friedrich Karl of Prussia, who was brought down over the lines of the 26th Bn., A.I.F., at Lagnicourt, and was shot as he was running towards his own lines. (*See Australian Official History, Vol. IV, pp. 189-90*.) He was carried to the Aid Post and evacuated first to the 5th Australian Field Ambulance at Pozieres and thence to a British C.C.S. at Edgehill (Dernancourt), where he was operated on and sent to Rouen. There, after promising well, he died. He told the Chaplain "I was doing important work for my Commander when I was attacked by British aeronauts. I kept on my course at first, but soon I found I had to defend myself against their determined onslaught. The contest was keen and exciting. I was hit on my foot and the pain was intense, but that was not my undoing. My machine was hit in a vital part and, although I did my utmost to get back to my lines, I was compelled to descend in full view of the Australians. I saw the predicament I would be in when I landed, so decided to burn my machine and run for it. The Australians were too clever for

Attached to each wing in France was—

- (a) One medical officer whose duty was to keep in touch with the flying personnel of the wing and to see all sick officers.
- (b) A special hospital (No. 24 General) at the Base where any officer suffering from any disorder due to flying or of particular importance as regards flying, was sent on the recommendation of the Wing Medical Officer. There, special examinations were carried out by three or four medical officers with special training, who also constituted a Special Medical Board Officers requiring evacuation to England from this hospital were sent direct to the Mt. Vernon Hospital, Hampstead, special arrangements being made for continuity of investigation and treatment.
- (c) Ordinary sick and wounded were treated in the ordinary field hospitals and on discharge were sent to R.F.C. Base Depots their cases being considered by a special R.F.C. medical officer who decided on their ultimate disposal.

In 1918 when the Secretary of State for Air was appointed, and the R.A.F. formed¹⁰ separately from the British Army and Navy, the Australian Flying Corps still formed part of the A.I.F. but its administration was gradually reorganised. The squadrons were now given their Australian numbering and in July 1918, when No. 2 and 4 Australian Squadrons were brought together at the same aerodrome, General Birdwood took action to have an Australian medical officer temporarily attached for duty. On August 5th Major F. A. Gray, A.A.M.C., joined them, being the first Australian medical officer to be specifically allotted for duty with the A.F.C. in France.

The casualties sustained by the three squadrons in France were:

Killed in action	..	..	..	38	officers	3	other	rank
Died of wounds	..	..	..	10	"	4	"	"
Died of disease	..	..	..	2	"	14	"	"
Died of other causes	..	..	..	4	"	2	"	"
Total deaths	..	..	..	54	"	23	"	"

me, and gave me a warm time when I took to my heels. I had a sporting chance and took it, but I was not a winner. I felt a twitching sensation in my back and fell forward, done for. The Australians, whose prisoner I became, treated me with the greatest kindness. They are sportsmen and great men. I have a wonderful admiration for them. If I am anything I am a sport. I have played tennis with Wilding and other first-class players. I shall never forget the jolly time I had in England when I played them all. . . . The kindness which has surrounded me since I became a prisoner has brought back the memory of those days. The Australians were good to me; the officers and soldiers who attended me coming down the line were very considerate, and the whole atmosphere of this hospital is kindness."

¹⁰ The R.A.F. operating with the B.E.F. comprised at the Armistice 17 wings, 84 squadrons, 5 special duty flights, and 26 miscellaneous units. On the Western Front since July 1916 (when detailed records were first assembled) the R.A.F. destroyed or brought down 7,054 enemy aircraft, dropped 6,942 tons of bombs, flew over 900,000 hours and fired over 10½ million rounds at ground targets.

Wounded in action	.. ..	64	officers	16	other ranks
Prisoners of war	.. ..	17	"	—	" "
Gassed	.. ..	—	"	6	" "
Sick	.. ..	82	"	239	" "
Total casualties		217	"	284	" "

But it was the responsibilities at the Base rather than in the field that absorbed the main effort of the medical service on behalf of the air force. Here the idea of prevention dominated the activities of the medical service to a degree unapproached in any other of its responsibilities.

It had two very special functions—selecting the flying men suitable to enter the force, and deciding when an airman must be passed out of it. Prevention of wastage in training and of unnecessary break-down were its chief concern. The importance of this work can be gauged by the fact that the reinforcement demands of the British air force for pilots in 1917-18 were computed to amount to 500 per cent. per annum—at which rate the personnel would turn itself over in about ten weeks. Of this wastage a quite extraordinary proportion occurred during the first six weeks of training. Even after the establishment of the British special Medical Air Boards had reduced the general breaking-down rate during training by approximately 50 per cent., over 10 per cent. of the specially selected recruits for the A.F.C. were passed out from the training squadrons as “unlikely to become efficient flyers”; and almost half the casualties among the pilots of the A.F.C. occurred during the period of training.

The air forces were rapidly expanding, and to reduce this wastage by making as far as possible sure that unsuitable men were not selected was a prime necessity. A necessary preliminary to this was to make sure what were the favourable or unfavourable qualities and how to detect them.

The primary line of medical defence lay, obviously in the initial medical examination of the candidates. That recruiting for the air force was a very special matter can well be understood. Careful study of experience revealed that certain types of men, and men with certain types of defects, were likely to

become wastage. To eliminate these, a procedure was gradually designed and examiners were specially selected and trained. A second line of defence lay in the elimination later of those unable to maintain the flying standard considered necessary. Investigations carried out after accidents provided means of additional knowledge and enabled the methods of initial examination to be improved. Medical policy was determined largely at the War Office on the advice of specialists, and during the war itself procedure was revolutionised by knowledge gained in scientific investigation.

Flying personnel were examined by specially trained boards and treated in special hospitals. Auxiliary personnel, mechanics, administrative staff, and so forth, were subject to ordinary medical procedure.

In the early part of the war little attempt was made to apply physiological knowledge and principles in the selection of candidates for the Flying Corps. Commonsense and applied observation of the type of men found most successful in active service was all that was thought necessary, over and above insistence on the ordinary standards of fitness. This was largely because scientific knowledge of the subject was inadequate and inexact; it is true that estimation of individual character and "temperament" played throughout the war an important part in the examination of the recruit. Ultimately, however "rule of thumb" gave way to scientific tests based on physiological knowledge and carried out by instruments of precision, both of which with greater knowledge were progressively simplified and better adapted. But they have not, and never will, replace "observation".

The special boards for examining flying personnel were formed in 1916. Arrangements were made that they should not only examine entrants, but should re-examine airmen during training and also prior to invaliding. Until the last year of the war all Australian candidates in Great Britain for flying commissions were examined by them. Knowledge now applied by the British in these tasks was gained by

- (1) Experimental laboratory research into various physiological questions involved in the very unnatural processes of flying.
- (2) A more general investigation on the flying ground and in the

field of individuals: the correlation of this so to speak clinical observation with the laboratory findings: and the deduction therefrom of principles for guidance in selection and treatment.

It must be recollected that flying and fighting are by no means synonymous, and fitness for the one did not necessarily involve success in the other.

A pupil under instruction (wrote Lieut-Colonel Birley in a report to the Medical Research Committee) is chiefly of interest from the point of view of his capacity as a pilot (*i.e.* a chauffeur), whereas in the field the fully-fledged flying officer absorbs our attention in his capacity as a combatant. . . . The flying temperament, *i.e.* the temperament for flying *per se*, is of little importance in the field, since those devoid of it do not, with few exceptions, reach the active service stage. The temperament for fighting and for combatant service in general is, on the other hand, a matter demanding our close attention.

With the investigation in the field the A.M.C. had no direct participation. The work of Major Kellaway in England, as part of the research carried out under the direction of the Air Investigation Committee of the M.R.C. especially with reference to the effects of oxygen deficiency (anoxaemia) has already been referred to.¹¹

The Medical Research Committee had offered its Central Research Institute at Mount Vernon Buildings Hampstead¹² to the Air Board for the elucidation of the problems of special disabilities associated with flying, especially with flying at high altitudes. Towards the middle of 1917 the Medical Research Committee hospital buildings and grounds at Hampstead were assigned as a hospital for officers of the R.F.C. The Secretary of the M.R.C. was appointed to the Air Medical Services Advisory Committee, and in March 1918 an Air Medical Investigation Committee was established.¹³ When the Royal Air Force was formed a Medical Administrative Committee was appointed to advise as to the establishment of its medical service. Members of the R.A.M.C. who had served with the Royal Flying Corps were gradually absorbed into it and came under the *Air Act*.

¹¹ See *Chap. v.* Major Kellaway worked under direction of Dr. H. H. Dale in the Bio-chemical Department of the M.R.C., housed at the time at the Lister Institute.

¹² Earlier in the war the institute had been used for the investigation of heart disorders and other military medical problems.

¹³ Several reports were issued by this committee, one, "The Sense of Stability and Balance in the Air" was submitted by the Chairman, Henry Head, F.R.S.

It was while these gradual changes were proceeding in the R.A.F. that General Howse's attention was called to the need for change in the A.F.C. also. By the beginning of 1918 he had sensed—as usual more by military considerations than by medical ones—that it would be necessary for him to take a more active part in the medical affairs of the A.F.C. He was always in peculiarly close touch with the combatant leaders and their problems. He was almost aggressively utilitarian and an opportunist—in the best sense—in administration. That a change was desirable was recognised by both the British authorities and those of the A.I.F.

The actual change was gradual, somewhat similar to that which led the Australian Medical Service to a greater degree of independence inside the imperial structure after Gallipoli. The problem which first thrust itself forward was the old one of the quality of recruits from Australia, those arriving with commissions being found in a large number of instances medically unfit for flying. Among the reinforcements were found, for example, two who were almost completely colour blind. As all pilots sent from Australia were officers, such mistakes were particularly serious.

The Australian Flying Corps was recruited from two sources, the A.I.F., and Australia direct. At first the recruits from Australia were supposedly “trained” there, but it was almost always necessary to train and even medically examine them again. At the beginning of 1918 it was decided to despatch an A.I.F. “Commission” to Australia, composed of senior members of the A.F.C., with a view to bringing up-to-date the arrangements there and, in particular, of improving the selection of recruits and the quality of training. In January, an A.A.M.C. Officer, the junior A.I.F. Medical Consultant, Major Turnbull, whose civil practice and special boarding and hospital experience in the A.A.M.C. had fitted him for the task, was by arrangement with the War Office attached to the headquarters at Arkwright Road with the object of making himself acquainted with the special requirements of the air service and with the special methods of examination adopted. He was closely associated with the boarding of Australians, and General Howse was thus

enabled to obtain insight at first hand into the requirements for special boards. Major Turnbull was sent to Australia but his task fell through owing to the acceptance by the authorities in Australia of the recommendations made from the A.I.F. by cable on March 12th:

In view of the fact that many Australian Flying Corps officers commissioned in Australia are found on arrival "medically unfit for flying in any capacity" it is strongly recommended that pilots trained in Australia be appointed cadets and commissioned in England when they finally graduate, as is done with those trained here. . . . Maximum age should be under 23. . . . Recommended all enlistments be made for general service in A.I.F.

Major Turnbull made a few examinations, however, in Australia; and it is of interest to note, as illustrating the special character of air force examinations, that the majority of cases passed by him had previously been rejected, and *vice versa*.

The next stage was trouble over the quality of the recruits presented to the Air Board from the A.I.F. It reached a climax when, during the general reorganisation, the A.F.C. training squadrons in England were combined into an Australian Training Wing and assumed responsibility for the training of reinforcements for the squadrons in France. These were subject to preliminary selection in the field or elsewhere to reject the obviously unfit and so minimise the number of rejections by the special board. This duty was, apparently, performed very indifferently—to obtain the quota of 25 trainees a month it was found necessary to examine about 35 "selected" men from the A.I.F. and an almost equivalent number of reinforcements from Australia.

On General Howse's attention being drawn to the matter enquiries were begun by which, by a process of peaceful penetration, gradually but inevitably, full responsibility for the medical administration was taken by the A.A.M.C. Before investigating the defects in the preliminary boarding General Howse's staff had to become familiar with the principles and methods of the selection of air force personnel: and when the preliminary boards were being dealt with, defects in the methods of the special boards were discovered—at least so far as they

dealt with Australians. The administrative officers of the A.F.C. had found that in the medical examinations both for the commissioning and for the invaliding of Australians, medical officers of the British Service lacked personal knowledge of Australian temperament, and also special opportunity for enquiry into the records of individuals. Both these matters were acknowledged to be of first-rate importance in connection with fitness for the air service, and the formation of the Australian Training Wing in England offered a chance for Australians to gain air service experience and to begin taking over responsibility.

The arrangements for the A.F.C. in England at this stage are summarised by Howse as follows:

1. Cadets for commissions are examined by R.F.C. boards for commissions, at Hampstead (40 per month).
2. Invalid officers are boarded by R.F.C. boards at Hampstead, and are reviewed by D.M.S., A.I.F. (12-15 per month).
3. A senior A.A.M.C. officer attends R.F.C. Medical Boards at Hampstead and assists in examination of all Australians.
4. Invalid officers are treated in special R.F.C. hospitals when necessary.
5. Active personnel.

A medical officer is attached to each of the training squadrons and to the training depot to carry out the ordinary work of an R.M.O. The medical officers have to be in constant attendance in case of an accident, and to keep careful records of the general health of all A.F.C. personnel.

Perusal of board papers of officers invalided from the A.F.C. indicated that the Australian Medical Service should extend its intervention. Indeed the Australian D.A.A.G. at Royal Flying Corps Headquarters in France, Major Clive Baillieu, wrote in February 1918 that, as the A.F.C. was increasing, it would be wise to provide special medical supervision. The R.F.C.'s Senior Medical Officer, in France, suggested that one of the Australian medical officers from the Australian Training Wing should visit France, "live for a few days with a Corps squadron and a scout squadron and visit No. 24 General Hospital where he can see the methods which we employ for establishing the fitness or otherwise of an individual for work in the air".

Major Baillieu submitted a helpful memorandum on the

principles which should be adopted in organising a special A.F.C. Medical Service.

Howse had, however, selected for the training wing officers generally too old for service in France and for pioneering the innovation. He adopted other lines. By attaching Major Turnbull to the special board he had been able to make himself personally acquainted with the requirements of medical boarding for the air force. In a memorandum to General Dodds (D.A.G., A.I.F.) in May 1918 he submitted the following statement and recommendation:

I suggest that a senior officer be appointed who has some knowledge of the medical requirements necessary in a candidate for commission in the A.F.C. He would be attached to staff of Headquarters, A.I.F., and in the event of his time not being fully occupied, would assist in the general office work. He would carry out the following duties—

1. Attend the R.F.C. Medical Boards at Hampstead and assist in examination of all Australians, *i.e.*—
 - (a) Candidates for commission;
 - (b) Invalids.

His official position at these boards would give him an opportunity of gaining a knowledge of the special medical conditions which render a man unfit for flying.

2. Investigate the methods of examination and treatment of invalids at the special R.F.C. hospitals in France or U.K.
3. Confer with the Medical Research Branch of R.F.C. at Covent Garden Hotel with a view to ascertaining the latest researches on the medical aspect of flying.
4. Systematise and record the medical condition of Australian candidates for commission.

At present, candidates are carefully examined by R.F.C. boards but no record is kept of their condition at this first examination. It is of the greatest importance that a complete record be kept of all candidates, not only at their examination for commission, but at all subsequent medical examinations.

I think that by the constant medical supervision of a medical officer, as suggested above, greater economy in lives and material, and a higher degree of efficiency could be maintained.

In April, Major G. C. Willcocks, A.D.M.S.(2), on Howse's staff was appointed temporarily to the position referred to and went for two weeks to France where he made himself acquainted with the special requirements of the squadrons. His place was taken permanently in May by Captain C. H. Kellaway, who was

attached to the R.A.F. boards in England and began immediately to organise arrangements for a special A.F.C. Board, including installation of the necessary apparatus. Other officers received instruction in the special aspects of the examination, and on 5th June Kellaway recommended to the D.M.S., A.I.F. "that the examination of candidates for commissions and the boarding of invalided officers in the A.F.C. be taken over". The Board was constituted by instructions issued by the D.M.S. on July 27th to three officers, one physician, Major Edgar Stephen, one surgeon, Captain Kellaway, and one eye, ear, nose and throat specialist, Major E. Brown.¹⁴ As members of A.I.F. Commissions and Invaliding Board they were to—

undertake the examination of candidates for commissions in the A.F.C., and the boarding of invalid A.F.C. officers at these Headquarters, commencing 9.30 a.m. on the 30th instant. . . . Examinations will be made in accordance with the procedures adopted by the R.A.F. Medical Boards at Hampstead, and the suggestion in the pamphlet on the examination of candidates for commission in the R.F.C. will be followed unless any different standards or procedure have since been adopted.

The Commissions Board began to operate at A.I.F. Headquarters on 29th and 30th July 1918, when 56 candidates were examined, of whom 26 were passed fit as pilots, 12 deferred and 18 rejected as unfit for pilot or observer. Between that date and the Armistice a total of 295 candidates were examined, of whom 202 were passed for pilots, 9 as observers only, 64 were rejected, the remainder being deferred and not presenting themselves again for examination. The Invaliding Board first met on August 10th when 10 A.F.C. officers were boarded; thereafter boards were held weekly. The total number of boards on A.F.C. officers up to 7th February 1919, when the special board was demobilised was 328.

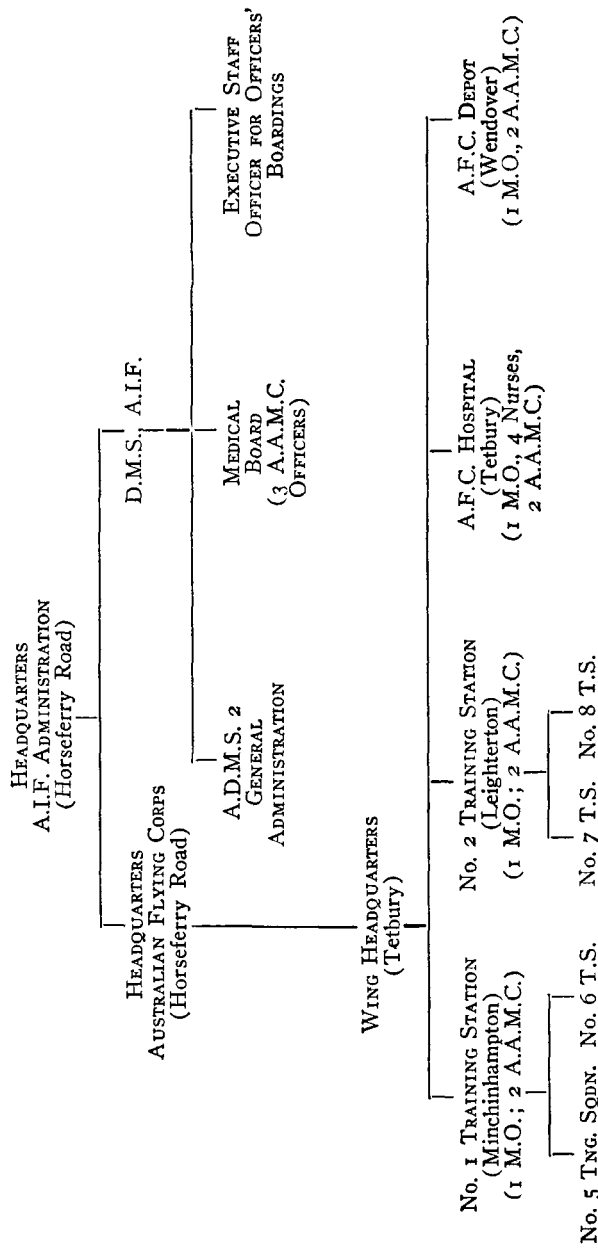
The final organisation of the medical service of the Australian Flying Corps was as set out in the following diagram:

¹⁴ Their special provinces were

Major Stephen, medical examination;

Major Brown, aural examination excluding muscle sense, nervous stability, and mentality,

Captain Kellaway, surgical examination, nervous system and vestibular stability.



FRANCE

Three squadrons each of three flights: Liaison Officer, A.F.C. attached at G.H.Q., R.A.F. From August 1918 an A.A.M.C. officer attached to Australian squadrons and one corporal A.A.M.C. to each squadron with two ambulance waggons and equipment. (Nos. 2, 3 and 4 Squadrons.)

EGYPT

One squadron of three flights. A.A.M.C. officer and corporal A.A.M.C. attached. (No. 1 Squadron.)

A few notes may be given on the components of this scheme.

1. *The A.I.F. Flying Wing for Training.*

This was formed in England on 16th January 1918, with its headquarters at the picturesque and old-fashioned town of Tetbury in Gloucestershire, near to the old Roman Camp of Cirencester. The Australian medical officers attached to it were occupied solely in first-aid (which bulked largely in training work) and ordinary R.M.O. duties.

Up to June 1918, serious cases of sickness and accidents in the A.F.C., at the training stations, were treated in the very efficient local Cottage Hospital. It was soon found, however, that the number of casualties from training accidents called for special arrangements. In May 1918, the old Alms House was taken over by the D.M.S. (the inmates being boarded out) and, with its five wards, was transformed into a small A.A.M.C. hospital staffed by one medical officer, four nurses, and two A.A.M.C. orderlies. It was conveniently situated about seven miles from each of the training stations.

The work of these medical officers was responsible though not arduous. Accidents occurred almost daily. In the A.F.C., as in the R.A.F., the extreme pressure from the front for reinforcements did not permit the gradual training of peace-time. The supply of pilots and observers was never in excess of the demand, and at one time pilots were sent to France after not more than 20 hours of actual flying experience.

2. *Special Commissioning and Invaliding Board, A.F.C.*

General Howse's first action in connection with boarding was to issue precise instructions to A.D's.M.S. in France and to medical officers at the training wing regarding the preliminary examination. It was laid down that—

A thorough medical examination is to be made of candidates for commission in the A.F.C. by a medical officer who must ensure and certify that the candidate is in all respects "fit for general service". If there is any doubt as to candidate's visual or aural fitness, a second medical opinion by a specialist should be obtained. The standard of vision for pilots and observers is—

		Without glasses	With glasses
Better eye	.. .. .	6/12	6/6
Worse eye	.. .. .	6/18	6/12

Boardings for commissions and for invaliding were carried out separately and differed considerably in method. The eye and ear specialist was included only in the boarding of entrants. There was a routine procedure and specialisation—a final assessment by the two senior officers being an important part of the procedure.

The methods used (says Major Kellaway) were the outcome of an extensive series of British investigations.

The following is a résumé of the procedure :

Commissions: The process of examining candidates for commissions was very detailed, attention being specially directed to the condition of the cardio-vascular system, the stability of the nervous system, and the estimation of the functional efficiency of the sense organs (particularly those of vision) and of muscular and of vestibular sense. Special tests based on research had been adopted by the R.A.F. and proved of great value. The most important were those of general nervous stability, as estimated by the absence of tremor; of muscular sense—by ability to carry out successfully balancing objects in unstable equilibrium at arm's length; of vestibular stability by testing the gait after rotation in a chair; of cardio-vascular efficiency by changes in the pulse rate after exercise and by capacity for sustaining a column of mercury.

In two reports to General Howse in September 1918, Major Kellaway mentioned that in the important matter of eyesight, examination of which was very complete,

it has been found that concealed hypermetropia is a serious obstacle to efficient landing. The candidate is tested with the Snellen test types with a plus 3 lens in front of each eye in succession. Normally his vision should not even be 6/60 under these circumstances.

A candidate whose vision is 6/9 or 6/6 with either eye with a plus 2 lens should certainly be rejected as a pilot. Such a condition does not, however, prevent his admission as an observer.

For colour vision, the Edridge Green colour perception lantern was used.

In physique, the individual might be—

one of several types, any of which may be suitable for air work. . . . It is the total impression made upon the mind of the trained observer, and not the gathering together of a large number of isolated observations which is important, and an attempt should be made to correlate this whole impression with the ability which the candidate has previously displayed in sports and games.

“Medical” examination, as distinct from surgical and special, included :

(a) habits, (b) games and sports, (c) occupation, (d) illnesses, (e) family history, (f) heart, (g) pulse, (h) thorax, (i) abdomen, (j) nervous system, (k) mentality.

Under "habits" is noted:

Any indication of habitual excessive use of alcohol is a sufficient cause for rejection. A careful record is made of the number of cigarettes smoked daily and the existence or otherwise of the practice of inhaling.

As to games and sports, while the importance of their "moral" training, and their value for promoting self-reliance and endurance, were fully appreciated, it was noted:

many of the most successful airmen, however, have not exhibited great proficiency in games, and too much stress should not be laid on this part of the examination.

"Cardio-vascular debility" was one of the most frequent causes of rejection and precise instruction was given for its detection.

One of the commonest causes for rejection was "nervous instability", for the detection of which special methods of examination also were devised.

In the important subject of "temperament"

it must be admitted at the outset that there is no one temperament which above all others is suited to the work of flying, and good pilots may be found among men of sanguine, phlegmatic, or nervous types. . . . The qualities which make for success in other occupations are also important here . . . the quality of being difficult to discourage by failure, calmness and clear thinking in dangerous situations.

It was noted that "service in the Forces . . . especially if there has been a history of long service in the field, may furnish a not to be neglected commentary on the subsequent examination".

The examination of officers for invaliding was detailed and elaborate. Information was supplied by it as to the number of weeks of unfitness for flying (1) for general service, (2) for home service, and (3) for ground duties only at home or abroad. Further, officers who were found of no further service for flying were classified as:

- (a) Fit for general service;
- (b) Fit for home service;

- (i) Active duty with troops
- (ii) Sedentary employment only.
- (c) Permanently unfit for any further military service.

The diagnosis, treatment, and prognosis of "flying stress" or "exhaustion" was preceded by the statement that

the mental picture presented by the pilot or observer who is suffering from stress does not differ in essentials from that of the tired-out infantryman. . . . One of the immediate effects of a single flight at a great height may be marked mental and physical fatigue. After a prolonged period of flying, whether on patrol duties, artillery observation, or low strafing, or after one or more crashes, the picture of flying stress may be developed.

There was an interesting difference of opinion as to whether recruits fresh from Australia or hardened veterans from the A.I.F. made the best airmen. General Howse, backed by a large body of opinion, chiefly medical, expressed the view that suitability for flying service lay entirely with the former. Writing on 16th March 1918, to the D.A.G., A.I.F., he said he was informed that—

squadron commanders in France have found that men selected from the A.I.F., who have served with "front-line" units in France did not last as long as those selected from reinforcements. This statement is apparently supported by the Chief Medical Officer of the R.F.C. in France.

From my own observation I feel confident in stating that a man's fitness for service in the "front-line" is for a limited period, and, if the strain is heavy and continuous, is rapidly exhausted; consequently it is advisable, as far as possible, to select men for the A.F.C. who have not expended any portion of their fitness for front-line work before their selection.

It is a fact that some hard fighters, who felt their nerve shaken by bombardment on the ground, applied to join the flying service. Major Kellaway particularly remarked that recruits often left the infantry because they found that they were "losing their punch" and hoped in changed conditions "to regain their initiative". That this course was unwise is strongly supported by the opinion embodied in a memorandum to the D.A.A.G. by Lieut.-Colonel Birley, R.A.M.C., medical officer in charge at R.F.C. Headquarters in France in February 1918:

At the present moment I think it right to draw attention to the somewhat high proportion of break-downs among pilots and observers of the A.F.C. in France, especially as this wastage is, in my opinion, to

some extent preventable, seeing that it is in a large measure due to the fact that the majority of these officers have already served many months in combatant units, and have experienced the strain incidental to such arduous campaigns as Gallipoli, Egypt, and the Somme. . . .

It is a mistake to suppose, as is sometimes done, that a man whose powers of resistance to mental and physical strain have been sapped by continuous shelling on the ground, will find relief in the air, for experience shows that the direct opposite is the case.

On the other hand, responsible flying administrators are emphatic that men recruited from approved fighters of the A.I.F. should "eat up" those who reached the field for the first time as flyers. That there is much in this contention is suggested by the fact that the proportion of decorations won in the air force by recruits from the A.I.F. was enormously greater than that won by entrants direct from Australia.

Probably the reason for the discrepancy lies in the fact that *fighting* and *flying* were not synonymous. The proportion of individual hard fighters is probably comparatively small even in the Australian infantry where—though possibly less than in most armies—men fought as a herd. Only hard fighting spirits from among these experienced men would volunteer for service in the air; there, being good fighters as individuals, they may have belonged to a minority certain to distinguish itself.

It was generally agreed that long service often resulted in staleness and in some cases in complete nervous instability even in men noted for their fighting qualities; also that, *prima facie*, youth was a considerable though somewhat uncertain reason for selection. But whether the idea of a fixed reservoir of nervous energy, as expressed by General Howse, has enough truth in it to be allowed to influence policy in the selection of fighting flyers may be doubted. War experience did furnish strong evidence that a prolonged strain of service tended to unfit men for war-time flying. Such men, however, were usually thrown out in the training, if not rejected by the board; the men who reached France would be either trained fighters from the A.I.F. or unblooded flyers from the recruits. The casualties in the training camps in England were as heavy as those in the fighting squadrons in France, or heavier—a natural result, as has been seen, of the urgency and violence of the training—as an A.F.C. administrative officer of wide experience said, "It soon

cut out the nervy old soldier." The fatal casualties incurred by the A.F.C. in France and the United Kingdom were:

	Killed in action.	Died of wounds.	Died from disease.	Died of other causes.	Total deaths.
B.E.F.	41	14	16	6	77
U.K.	—	—	20	51	71

Comparing the principles and methods in use to-day for selecting men for training as fighting pilots with those achieved at so great cost in the war of 1914-1918 it seems fair to suggest that there are still useful lessons in that experience; and for the Australian Flying Corps it may be claimed that the medical foundations of the Royal Australian Air Force were "well and truly laid" by Surgeon-General Howse and his little group of medical officers.¹⁵

Note. It has not been thought desirable to attempt in any way to bring the problems of Aviation Medicine up to date. The propriety of this decision is made the more obvious by a glance at the monumental *Bibliography of Aviation Medicine*, by E. C. Hoff and John F. Fulton (1942: Chas. C. Thomas, Springfield and Baltimore, U.S.A.: copy in Australian War Memorial Library).

For a peculiarly interesting presentation of the problems of present-day Aviation Medicine in all its bearings those interested may confidently be referred to the latter's Shattuck Lecture, "Medicine and Air Supremacy" (*Maryland Journal of Medicine*, May 26, 1942: Reprint in A.W.M. Library). Dr. Fulton is Stirling Professor of Physiology in Yale University, and is Chairman of the Committee appointed to direct the production of the American Medical History of this war.

¹⁵ It may perhaps be noted that Gen. Howse's officers are filling many of the chief medical posts in the R.A.A.F. to-day.

SECTION III—THE TECHNICAL SPECIALTIES

INTRODUCTION

UNTIL the modern era military medicine was surgery and military medical officers were first, foremost and all the time surgeons. In the army the "official" history of internal medicine can hardly be said to date beyond the 17th century, and in particular to the creation of the British regular standing army of 1660. Thereafter (until the eclipse of the "apothecary" in the 18th century) surgeons, physicians and apothecaries were concerned in the direction of the Medical Department of the Army. In the middle of the 19th century Miss Florence Nightingale and Sir Sidney Herbert forced preventive medicine on a subservient and discredited service, and in 1857 as we have seen the "Army Hospital Corps", forerunner of the Royal Army Medical Corps, was created. A "professional" Army Nursing Service was the inevitable outcome of the Crimea and the Nightingale system of nursing.

It was left for the Great War of 1914 with its inexhaustible demands for effectives and the apotheosis of "return to duty" to compel a more complete and exact differentiation of specialties within the service itself and the Medical Corps. Already pharmacy had found its level as a service subsidiary to internal medicine, and its personnel had been "put in their place" in the high-handed and unpleasant fashion traditional of the orthodox official medical profession. Together with dentistry, and physio-therapy, pharmacy claimed "a place in the sun" within the medical department of the Army—it required social as well as a technical recognition.

In any army—but particularly in the older European ones—social status for a profession may be achieved in one way and one only—by inclusion of a proportion of "officers"¹ within

¹ In the British and dominion forces "officers" were those whose rank was held in virtue of a "commission" from the King and not of an Army Warrant.

the technical establishment laid down for its personnel. It is impossible for anyone outside the British Army to understand the fierce jealousy with which in that army and nation the commissioned class guards this social privilege, nor the utter and complete social distinction which before this war, and even during it, was conferred thereby. Nor was the British Army unique.

Rightly, therefore, to understand the evolution of the auxiliary medical services, it would be necessary to traverse the history of "commissioning" in the British Army. Fortunately, it is not necessary to undertake this invidious task.² But it is necessary, since the future structure of the medical service in a great measure depends on the spirit in which the problem is faced, that the facts be recorded as they influenced developments in the A.I.F. in the war of 1914-18.

The question of granting commissions in the Australian Army Medical Corps to members of the civil community, outside the medical "profession"—instead of practically restricting it by law to qualified medical practitioners—was, in the war of 1914-18, a cause of dispute and disaffection so considerable as to interfere, if not with the actual efficiency of the service, at least with its harmonious working. The main questions arising were (1) the criteria which should be held to justify the promotion of any particular group of technical experts

² For the uninitiated it is necessary to any understanding of the Army system that the significance of "commissioned" and of "non-commissioned" rank should be made clear. To generalise, it can be said that commissioned rank allocates the right of initiative and direction in matters of policy—whether these be concerned with the tactics of battle or with methods of maintenance. And as an outward and visible sign of the principle of command and obedience, by which alone battles or Test Matches may be won, it is obvious that gradation of rank is a *sine qua non* to effective execution.

But while this must be recognised it is necessary to an understanding of the practical problem of British Army organisation to appreciate the fact that the distinction between commissioned and non-commissioned rank in the services is not inherent in or necessarily created by the absolute or relative importance of the executive duties associated with the two types of "rank". As interpreted in the past in the British Army the distinction between the two is absolute and fundamental; there is no real gradation that bridges the gap. Each type of rank—commissioned, and "warrant" or non-commissioned—has its own gradation, and between the two there is "a great gulf fixed" and the gulf is essentially a "social" one. The distinction is a heritage from the feudal system, the relation is a reflection of social conditions (already obsolete in some nations) exemplified by position "above and below the salt" or of the social distinction into "gentlefolk"—and others. With the industrial era, wealth and in some degree, education, partly replaced "hereditary" right to military command. The only justification for the system is that "it works" as no other system as yet devised has done. Whether or not "democracy" can find a better, depends, like many other problems of social relations, on whether we are really resolved to do so.

or "specialists" to such a privilege and (2) if the right to receive a "commission" was accepted, what ranks were appropriate to the particular specialty? Should it be given an independent "gradation list" for promotion? Should it be represented in the administration?

A closely allied question arose within the medical profession in itself. Entry into that profession is controlled by the University "faculties" or the professional "Colleges", "Associations", or "Societies" which are entitled by law to grant "licences" to practise medicine—such as the "Royal College of Physicians of London", the "Royal College of Surgeons of England" or the "Society of Apothecaries of London"; in Australia in 1914 by the Universities of Melbourne, Sydney and Adelaide.³ This legal "licence" to practise was accepted in the British and apparently in all modern armies as entitling to commissioned rank in the Army Medical Service. In addition, however, to this primary qualification various "specialties" have, in the course of medical evolution become differentiated. The primitive, and almost elemental differentiation is into internal medicine, surgery, and obstetrics and gynaecology. Of the rest the most essential may be listed as the practice of anaesthetics, ophthalmology and otorhinology, dermatology (including venereal disease), neurology and psychiatry, orthopaedics (clinical specialties); pathology, bacteriology, biochemistry and radiology (technical specialties); and hygiene and public health (preventive medicine). The war itself added the specialist in aviation. Here too the question arose—what rank and status were appropriate for this host of specialists. It was, however, much less urgent inasmuch as all were already officers by reason of their medical qualification being accepted as entitling them to a commission. The issue was essentially different. The only question that need be examined here⁴ is that of what may be termed the democratisation of the medical service by the admission to commissioned rank in the A.A.M.C. of elements from social groups other than, and hitherto regarded as socially inferior to, the qualified medical practitioners.

³ The University of Queensland now grants medical degrees.

⁴ For the position of specialists see pp. 431-32.

The social groups and callings in relation to which, in the late war, the problem of status and rank came into special prominence were dentists, pharmacists, registered nurses, and physical therapists (chiefly masseurs and masseuses) together with the personnel, voluntary and paid, of the "International Red Cross" represented by the Australian Branch of the British Red Cross Society. The last named, as we have seen, claims and is accorded a place of its own in relation to the mandate given by the Geneva convention to the medical service. The question of the status of the female nursing service is also *sui generis* by reason of the fact that a woman could not then⁵ be an officer or soldier of the British Army and can only be absorbed into or attached to it in a relation closely akin to that of the first "hospital corps".⁶

Pharmacy. The place of the apothecary and the pharmacist at the outbreak of war had in a great measure been fixed by tradition which reached back throughout the military history of Australia; the wartime developments were the result of the trend to a more democratic adjustment.

Dentistry. It is scarcely credible, certainly far from creditable to the medical service, that when the war began in 1914 dentistry as a science and art was not recognised as necessary in the wartime structure of the Australian Army. The early stages in the evolution of a dental specialty within the Army Medical Service and Corps have been recorded in the earlier chapters of this work.⁷ During the war this specialty developed a "Corps" complex which, following the tradition of the dental profession in civil life, found expression in an increasing demand for administrative and professional independence of the medical service, for the formation of a dental "corps" for independent administration as a "department" under the

⁵ This matter is discussed in *Chap. xi.*

⁶ Optometry as an organised technical calling did not enter into the picture, by reason chiefly of the fact that the medical profession was able more or less effectively to supply the requirements, and that the filling of optical prescriptions could be done outside the Army. The same may be said and with greater assurance of radiology since the medical radiologist had command of the technique as well as the clinical application of radiography, while at the outbreak of war only a modicum of medical men were capable of estimating an error of refraction. The employment of men who practised the art of "bone setting" did not come within the field experience of the Australian Medical Service, as is well known British experience in this matter was considerable—and was both chastening and salutary.

⁷ See *Index to Vols I and II under Dental Service.*

Adjutant-General, and for the right to independent bargaining regarding its status, ranking and military responsibilities.

Physical Therapy. In this occupation, as in that of pharmacy the question of commissioned rank and special "establishments" gave rise to a violent divergence of views, as between the Director of Medical Services in the A.I.F. (Howse) and the Director-General in Australia (Fetherston). The position achieved at the end of the war served as a "jumping off" point not only in a quest for still wider military recognition, but also in constructive peacetime work in defining the technical sphere of this group and in consolidating its social status.

The problem relating to each of these is examined in the chapters dealing with them; but the experience of 1914-18 suggests the lines of solution, at least in the democratic Australian Army.

(1) Gradual integration of the privileges and responsibilities of "commissioned" and "non-commissioned" rank respectively so that the distinction between them becomes one of *responsibility* rather than of *privilege*.

(2) That "rank" should be determined by the intellectual quality of the service required. The determination of "value" in this service may perhaps most readily—though still only crudely—be based on the social recognition of the "professions". It may be argued that the significance of the term profession is too indefinite to be used as a social yard-stick. But however vaguely defined, the term connotes a clear recognition of the essential factors involved in the scientific grouping of social service and hence of social groups. The chief distinguishing characteristic of a profession has been defined as

the application of an intellectual technique to the ordinary business of life, acquired as the result of prolonged and specialised training.⁸

The criteria determining the social status of a professional group may be postulated as—(1) the primary and independent character, or otherwise of the social services to be rendered; (2) whether or not its operations relate directly to human life

⁸ *The Professions*, by A. M. Carr-Saunders and P. A. Wilson, (Oxford; At the Clarendon Press, 1933, p. 491).

or activities; (3) the scientific quality of the service, and the technical skill required in its performance; (4) the degree to which the body of the community and controls its members for the protection and advantage of the public. Most of these criteria have formed bases for claims made by the several special services for recognition of rank, commissioned and non-commissioned.

Applying these criteria to the services concerned, it may be observed that the medical profession itself performs a subsidiary service, a service of maintenance, and the various services that compose it necessarily have this character. Moreover only two of the callings concerned can be regarded as of independent significance—the medical and the dental. The pharmaceutical, massage, and nursing services exist to serve the requirements of these two. And of these dentistry is—or at least was—confined to one local and clearly defined anatomical field of treatment; for the exercise of the higher functions of prevention and general treatment it has to call in the medical profession.⁹ It is indeed technically a specialty of medicine.

These are not, of course, the only factors in the question. The nature of the service rendered, or how intimately it is concerned in the essential duties of a military medical service, its “humanitarian” value, and even the tradition of social life, will have their place. But since the ascent of man is universally accepted as due to the evolution of a creative intellect, it cannot be doubted that a general acceptance of what may be called “intellectuality” as a main criterion in these matters would greatly promote a stable equilibrium in them.

The problem can justly be solved only on a basis of liberal common sense and democratic realism. It seems certain that the interests of the Army Medical Service, and of the special services will best be served by building up a self-contained medical service, with or without internal division into specialist corps, and gradation lists.¹⁰

⁹ See in connection with the future of dentistry, Prof. W. H. Gilmour (Royal London School of Dentistry), *Brit. Med. Jour* 3 Dec, 1932, p. 1032.

¹⁰ It is interesting to note that after the war the position of Director-General at the British War Office was held by a specialist in Bacteriology and Tropical Diseases, Sir William Leishman.

The first volume of this work, which dealt with the evolution of the Australian Army Medical Service and Corps, and with the problems that faced the service with the A.I.F. in what is now called the "Middle East"—in Gallipoli, Palestine, Syria and at the Base in Egypt—incidentally described the problems of the dental, pharmaceutical, nursing and massage services, and of the part played by the various professions of Australia in meeting these. The account was, however, written strictly from the point of view of the medical service as an element in the fighting forces and in particular of the Australian troops which had a part in the several campaigns.

The purpose of this series of chapters is so far as possible to present the history of each of the specialist services from its own standpoint. It is obvious that this could best be done by a member of the special arm, service and profession itself. That this was not found possible is deplored by no one more sincerely than by the writer, and in fairness he must put on record the fact that in each of the special arms and specialist services, excepting only massage—dental, pharmaceutical, nursing—special endeavours were made to arrange for this. The accounts have, however, been based largely on material supplied by members of the services. In particular the work of the dental service is taken almost wholly from memoranda and narratives compiled by its senior members for this specific purpose.

It has unfortunately not been found possible to include as had been proposed in this Section some account of the work of what are known as the medical specialties and which for the purpose of military medicine may be held to include diseases of the eye, ear, nose and throat, together with pathology, bacteriology, radiology and dermatology. Specialists in all these held commissions in the A.I.F. and as in civil life they played an important part in the work of the service.¹¹

¹¹ An account of ophthalmological work done at Lemnos by the ophthalmic specialist in No. 3 A.G.H. (Maj. Lockhart Gibson)—which unit was made responsible for all wounds to the eye during the August operations—was published in the *Guy's Hospital Reports*, Vol. LXX, 1919, as part of an article by the Consulting Ophthalmic Surgeon to the M.E.F., Lieut.-Col. H. L. Eason.

Observations on eye-sight and military efficiency made by Sir James Barrett while acting as ophthalmic specialist to the M.E.F. in 1915 and subsequently in the R.A.M.C. and published by him in his book *A Vision of the Possible* are original and valuable.

The question of the status and rank of medical specialists was a difficult and thorny one. The fact that administration and command carried much higher rank than the technical specialties made the position of many men of high professional standing very unsatisfactory since they must either give up their specialist work and compete for administrative positions in command, or remain at their special work with a low rank. The position has since that war been materially improved.¹²

¹² The involvements of this problem in the Royal Army Medical Corps are examined in *Chap v. See p. 231-2*, note by Maj. S. F. McDonald, R.A.M.C.(T.).

CHAPTER IX

THE AUSTRALIAN ARMY DENTAL SERVICE

I

THE POSITION IN 1914

THE Army Dental Service of the A.I.F. was in a very high degree special and peculiar. This in a great measure was due to the fact that it was created *de novo*, and its organisation and methods—the strategy and tactics, as we may properly say, of its employment—were wholly independent of British Army or any other precedent. The Service reflected, indeed, not only the mettle and methods of Australian dentists and dentistry, but very exactly also the spirit of the A.I.F. and in particular the outlook of the Medical Director, Surgeon-General Howse.

In these respects its experience contrasted sharply with that of the Medical Service of the A.I.F. in which policy and higher direction, except in matters of personnel, were almost exclusively British.

The different position in the dental service was due to the lack of policy, or indeed the negative policy, of the British Army and medical authorities in the sphere of dentistry.

In the Australian forces the impulse came from two directions—first, from the dental profession in Australia bringing its influence to bear on the Minister and the D.G.M.S. (General Fetherston). Second, from General Howse, who was a realist and sometimes in closer touch with the military needs than were his intimate associates—the Australian military commanders—themselves. General Fetherston, it is true, stubbornly opposed the initial reforms overseas, but in fairness to him it must be made clear that his opposition was due to a firm policy of adhering to British organisation in order to avoid, if possible, a confusing multiplicity of systems within the Empire's forces overseas. In each case he referred the question to the Director-

General of Army Medical Services at the War Office; and it was on receiving negative advice from there that he opposed the proposals.

The British policy was restrictive, not only in the number of dentists and dental units provided, and the status given to them, but, perhaps consequentially, in the extent and nature of work done. The consequence was that dominion dental units behind the Western Front were besieged by British troops and W.A.A.C's, for whom, especially in the base area, a great amount of work was done. Eventually, finding that Australian troops could not adequately be attended to and were being held back from duty because dentally unfit, the Australian authorities had to rule that only urgent operations were to be undertaken for other than members of the Australian troops serving with them.

At the beginning of the War of 1914-18 the only dental appliances in the Australian, as in the British Army, were a set of forceps carried by the Regimental Medical Officer and this officer was (as we must say) the only "dental practitioner" officially provided for the army in war. At its close a statement so characteristically provocative as that of Surgeon-General Howse—that as a factor in the achievement of victory, in a short war a dental service could less well be spared than a medical one—can scarcely be held outrageous. The reason for this extraordinary change lies deep in the whole scheme and circumstance of modern war and modern civilisation. Whether or not the chief factor in this amazing revolution is the modern scientific steel roller-mill or other sophistications in the production of modern diet, this much is certain—the "total" modern army can no more be made and kept efficient without an effective system of dentistry than can a modern nation. The new "Army Dental Service" is part of the technique of social life in our present civilisation.

Australia illustrates this as much, perhaps more than, any other nation. The word "nation" is used advisedly instead of "race". Evidence points towards social factors rather than genetic as still paramount in the pathogenesis of dental disease. But genetic evolution is based on socially determined selection.

The degenerative diseases of dental tissue seem largely to be confined to civilised man, and, in their present universality, it

would seem to ultra-modern civilisation.¹ They have this important feature in common with certain other chronic morbid processes, (for example, the allergic diatheses, chronic *otitis media*, certain chronic skin diseases, the "rheumatic" and "rheumatoid" states, and so forth, whose aetiology at the period of the war was obscure) that, in *themselves they are not directly fatal*; nor is their actual existence in an individual incompatible with health and efficiency. But in dental disease and deficiency this state of things is due in a great measure to the facilities and amenities at the command of a civil community in the matter of food and its preparation, and—especially—to the possibility of substituting artificial masticating apparatus as "dentures" which if inferior to the natural organ are reasonably adequate to the purpose. In civilised communities *the utter dependence of civilised man on his dentist* becomes evident only when certain ulterior effects of dental disease appear—chiefly in the form of local or systemic infection or when, as in war, circumstances compel a return to an environment in which sophistication of food is impracticable and the provision of artificial dentures difficult.

In all previous modern wars primitive conditions existed to a degree that induced military authorities to make decay or loss of teeth a definite bar to fitness for military service, both in peace and war. This was emphatically the case at the beginning of the war of 1914-18. Illogically enough, however, having thus recognised the importance of dental disease, the Army made no effective provision whatever for meeting its occurrence in soldiers after they had been accepted for service.

Probably the most important reason for the military neglect of dentistry lay in the historical despotism of the art of dentistry by the "orthodox" medical profession, and to the subordinate position of dentistry among the medical sciences, and of the dental profession in the related social groups or occupations; a subordination, however, much less marked in Australia than in Great Britain.² In 1914 the subject of dental disease was still held to be outside

¹ It is pointed out by Plimmer (*Food, Health and Vitamins*, p. 4) that Wellington's men did not have dentists but were of the finest quality.

² In justice to the first Australian Director of Medical Services, Gen. W. D. C. Williams, it must be recorded that so early as 1906 he had urged on the military authorities the inclusion of some form of dental service in the Australian Military Forces. His recommendation was refused by the military authorities.

the interest of the orthodox medical profession. There was little co-operation between the dental specialty and general medicine in the study and prevention of its causes and effects.

An important cause of military neglect was undoubtedly the fact that caries was to all intents universal and that, moreover, in regard to prevention, the dental profession was hardly more conscious of any obligation to the community than was the medical profession. To most general practitioners in both professions *treatment* was still the end-all of responsibility, save for the repetition of current banalities on which the general public was often better informed than the professions. Like general medicine, dentistry was "disease-conscious" but not yet "health-conscious". The public was critical of this state of affairs but had not as yet been enlightened. Homage, it is true, was paid by both professions to the "preventive" idea but both still looked on "preventive medicine" as synonymous with "public health". The fact that prophylaxis in dental decay must precede even birth had hardly yet affected the attitude of either medicine or dentistry.

But however much the dental and medical professions may have fallen short in their duty of showing forth the light that was in them, the most important element in the situation in respect of dentistry lay in the fact that *the light itself was faint*, and flickered with the frequent changes in the currents of dental and medical opinion regarding the aetiology of diseases of the teeth and gums. The cause of dental disease was at this time so imperfectly understood that effective socially applied measures of "prevention" were not possible. Dental prophylaxis was strictly a matter of *personal hygiene* since dental disease was generally held to be chiefly a local phenomenon, and due to extrinsic causes—chemical and infective.³

**Dental science
in 1914**

³It may be recalled that in 1914 the importance of the pre-eruptive stage of dental development and the susceptibility of the developing tooth to defects in structure, due to nutritional deficiencies in infancy and childhood, were but vaguely apprehended. It was (it is true) known that the "internal secretion" of the pituitary and other glands had an important influence on growth, development, and metabolism; that an effective supply of phosphorus and calcium to the developing organism was not entirely a matter of a fish diet and "chemical food"; that nutrition might be influenced by the presence or absence in adequate amounts of certain accessory food factors; and that dental development and "disease" might result from other than local factors affecting the fully erupted teeth. But all this was as yet only part of the "higher" science of dentistry, and the practical possibilities were discerned only by a few men of vision—among them, as the dental journals and the proceedings of scientific gatherings reveal, Australians. Even the funda-

As an art and craft dentistry appears to be almost co-eval with intelligent practice of medicine. The preface to the first written work on dentistry⁴ gives as the reason for their early dissociation that

The most celebrated surgeons, having abandoned this branch of surgery or having but little cultivated it, their negligence gave rise to a class of persons who without theoretic knowledge or experience, and without being qualified practised it at hazard, having neither principles nor system.

However this may be, one thing is certain—scientific dentistry began with John Hunter. Like surgery, dentistry was at first a craft of almost menial type. Of modern times it began indeed in the barber element of the barber-surgeon combination, and was left behind when surgery became scientific. There it remained, abandoned by surgeons and physicians alike, until this man arose who held nothing human alien to his interest. John Hunter's *Natural History of the Human Teeth* (1771) gave—as it may be said—to dentistry a foundation of “function” as well as of “structure”.

Hunter was the first to study the teeth in a scientific manner and the first to recommend complete removal of the pulp in filling them.⁵

Dentistry seems for a time to have been practised as a specialty of medicine. Thus in 1799 a dental surgeon was appointed to Guy's Hospital, London. But the rift between “orthodox” medicine and dentistry widened. An empirical practice of dentistry, especially in those operations that are almost wholly mechanical, had created a large body of dental artisans who, though often uneducated, developed a high degree of manipulative skill. There thus came to be two classes of practitioners the first regarding dentistry as a specialty of scientific medicine, the latter as a distinct and separate calling.

mental importance of the enamel in the development of dental caries, the fact that once erupted the teeth must stand or fall by the enamel as laid down in the intra-alveolar stage of the teeth: and that the development of this stage is critically influenced by diet and other factors—these truths were only being deliberated in the scientific background of dental teaching. The use of the tooth brush, with antiseptic accessories was, for the great body of practitioners, the beginning and the end of dental prophylaxis.

⁴ Pierre Fauchard's *Le Chirurgien Dentiste*, 1728 quoted from Garrison and *Encl. Brit.*, Vol. 8, p. 50.

⁵ Fielding H. Garrison, *An Introduction to the History of Medicine*, p. 348. (Philadelphia, W B Saunders Company, Fourth Edition, 1929)

Dentistry (says Sir D'arcy Power)⁶ was soon lucrative and fashionable; but only became a profession based upon scientific principles when Rogers and the Tomes—father (1815-95) and son—placed it upon a broad foundation. They were helped by a body of enlightened men who insisted that there should be a preliminary training, both in theory and practice, which should be tested by subsequent examination. The Dental Society was founded in 1856 and a Dental Register was opened in 1879. . . .

Quite early in the 19th century the United States of America became the home of scientific dentistry.

"In November 1840" (says the *Encyclopaedia Britannica*) "was established the Baltimore College of Dental Surgery, the first college in the world for the systematic education of dentists." In Great Britain dentistry was for the reasons given above very late in obtaining social recognition. Most of the medical schools there refused to furnish the desired facilities for dental instruction. Students from all over the British Empire, including many Australians, went to Philadelphia University to graduate and thence sometimes to Edinburgh to practise tooth extraction.

Modern dentistry is so obviously a specialty of medicine that there is hardly need to argue the matter.⁷ Its science, in so far as this is concerned with life is identical with that of medicine:⁸ its art, where this deals with living tissues is directed by the same laws and principles as guide the general surgeon. The discoveries of Pasteur and of Lister are alike the foundation of surgery and of "dental surgery": and the observations and researches that have resulted in our present knowledge as to the part played by accessory food factors in nutrition, and as to the influence of the "internal secretions" in metabolism, were as revolutionary in their influence on dentistry as they were on internal medicine.

Whatever the cause—and the question cannot even yet be regarded as having been more than exactly stated—there is no question that in 1914 *dental disease was—as it still is—exceedingly widespread through the Australian people.*⁹ Australians who were rejected for the A.I.F. on dental grounds numbered 15,773, the majority within the first eighteen months of the war. Infinitely the most common cause was caries. Pyorrhoea was

⁶ *A Short History of Surgery*, p. 65. (London: John Bale, Sons and Danielsson, Ltd., 1933.)

⁷ "This branch of medicine has now a foremost place among the medical specialties and especially as regards public health" (*Proceedings of the 5th International Congress in Military Medicine and Pharmacy*, p. 356.)

⁸ For the most part indeed, it derives from within the Medical Profession.

⁹ See Vol. I, Graph No. 9, facing p. 466.

not, so far as can be ascertained, a major element in dental practice in Australia. In particular Vincent's Disease was scarcely known there; its prevalence there since the war is probably largely due to its introduction by the troops, among whom, as "trench mouth", it was a major element in the disease picture of the front and army zone.

Before the war of 1914-18 dentistry in the six Australian States was still evolving its standards. Successive "Dental Acts" had made registration necessary, and were still tightening up—so far as vested interests and public ignorance would allow them—the qualifications, and the regulations under which dentistry might be practised. Even in New South Wales the old system of qualification by apprenticeship was still in force, side by side with that of university training. In settled areas on the coast the public generally demanded and obtained a very high average of dental skill and attention. In New South Wales and Victoria there were already faculties of Dental Science within the Universities; there were dental journals, associations and professional congresses. Large numbers of graduates were in practice. In the out-back portions of Western Australia and Queensland, where settlement was very scattered, little attention was paid by the inhabitants to their dental state and the dentists available were in many cases not highly trained. Nevertheless, on the whole, the dentist's status was higher than in Great Britain.

II

1915—THE SERVICE EVOLVES

In the organisation of the Australian Army Medical Services which took place after the Boer War of 1899, no provision was made at the outbreak for any form of dental service; nor, although Surgeon-General Williams recommended it in 1906, was this arranged for when the Australian Military Forces were again reorganised with the introduction of Universal Military Training in 1911. General Williams' suggestion had been rejected by the military authorities as "not required". A great opportunity was then lost to Australia of being in the forefront in an advance which was recognised by many medical men, military and otherwise, as inevitable.

When war broke out in 1914 many dental practitioners from

all parts of Australia volunteered for service as dentists, both in connection with the partial mobilisation of the Australian Military Forces for home service, and in training camps in Australia, and also for service overseas with the Australian Imperial Force. This desire on the part of the dental profession to serve as such was backed by a very general feeling in the medical profession that the formation of a military dental service was inevitable.

In New South Wales at the outbreak of war there was no arrangement for giving the troops dental attention. Men were rejected by the medical officer and instructed to have the work done by private dental practitioners. A few weeks later a number of dentists practising in and around Sydney offered their services free for a specified time each week. The Board of Management of the United Dental Hospital of Sydney made a part of the hospital available for the work. A roster of attendance of the dentists was drawn up which provided for a half-day attendance each per week. As much conservative work as possible was accomplished, all necessary extractions done and a certain number of dentures made by the hospital mechanics: the cost of materials was paid for out of hospital funds. For a few months this plan worked fairly well until the conditions proved that it was impossible to cope with the vast amount of work presenting.

In Victoria at the outbreak of war also no provision was made. Volunteers for the first contingents requiring dentures, or having bad teeth, were rejected. As the number was great the dental profession took the matter up, and, through the Council of the Melbourne Dental Hospital, made an offer to the Defence Department to carry out without cost the dental requirements of the first A.I.F. contingents leaving Victoria. This offer was accepted by the Minister for Defence. The Dental Hospital was placed at the disposal of the profession, donations of dental equipment and supplies were received from some of the supply houses, and the troops were paraded in batches of 300 to 500 daily. In addition, work was done gratuitously for the A.I.F. by members of the profession in their own rooms, and a number of fourth year dental students performed a great many of the minor operations for the men in camp.

Thus, as the result of the comparatively high standard in

connection with the examination of recruits, and of the public-spirited action by dentists in each State, the first Australian expeditionary force sailed from Australia in a fairly satisfactory condition as regards dental fitness.

**The force
sails**

Even before it reached Egypt, however, medical officers realised that the problem of dental treatment was destined to be important and difficult. Even before leaving Australia some Regimental Medical Officers had made their own arrangements. Further, a few dentists enlisting both in field ambulances and in the infantry had foreseen the need and taken steps to enable themselves to carry out the more urgent work. Arrangements were made to purchase, through regimental funds and otherwise, dental equipment. In several cases also, considerable sums were provided by the Australian Branch of the Red Cross Society. In some instances the men employed in this emergency were those with experience but without registered qualifications.

Representations by the Regimental Medical Officers to the A.D.M.S. and to the combatant commanders became more and more urgent. A memorandum by Lieut.-Colonel Frank Marshall, afterwards Staff Officer, Australian Dental Service, says:

**Early experience
in Egypt**

The dentists working with units were absolutely unable to do more than touch the fringe of what was demanded of them, though a considerable amount of work was accomplished. One Regimental Medical Officer *e.g.*, states that at the latter part of the Mena period, seven dentures per day were turned out in his battalion, in addition to surgical dental work.

The A.D.M.S. 1st Australian Division (Colonel Howse) took up the matter with the A.I.F. Commander, General Bridges, who permitted dental work to be done at Mena House (No. 2 A.G.H.), Regimental and Red Cross funds being used. But most of the work was done by civil practitioners in Cairo whose work was very uneven.

Before the 1st Division left for the Dardanelles Colonel Howse, on March 16th, prevailed upon General Bridges to cable to the Defence Department for leave to promote to commissioned rank a dental surgeon, Private McIntosh, who had done good work in the 1st Battalion. The application was refused by the D.G.M.S. (Colonel Fetherston) in Australia, even when it was repeated by General Bridges "in the interests of the troops",

and pressure was also being applied by the Dental Board of Victoria.¹⁰

Finally on 18th May 1915, the D.G.M.S. agreed that dentists might be appointed in Australia and Egypt, with rank of lieutenant.

An additional reason for Colonel Fetherston's reluctance to allow the commissioning of dentists from among the troops overseas was that he had repeatedly informed the dental profession in Australia, which by then had wrung from the Department the appointment of dental officers in Australia, that "dentists would not be sent with commissioned rank in the A.I.F." The change in Australia had followed on an increasing realisation of the unsatisfactory nature of a system by which what was obviously a vital and normal responsibility of the Defence Department was thrown upon the public spirit and voluntary effort of a civil profession. The objects both of the military authorities and of the dental profession were being defeated by it.

On 6th January 1915, therefore, approval was given for the formation of an Australian Army Medical Corps Reserve (Dental), comprising:

**Dental Reserve
in Australia**

Military District.	Captains.	Lieutenants.	Total.
1st	1	7	8
2nd	1	13	14
3rd	1	13	14
4th	1	7	8
5th	1	5	6
6th	1	5	6
	6	50	56

All ranks were "honorary", but this was the first recognition in Australia¹¹ of the principle of granting commissioned rank to members of the dental profession as such, and was the first step in the formation of an Australian Army Dental Service. The first appointments under the new establishment were not, how-

¹⁰ This time the War Office was consulted by the D.G.M.S. It replied that dentists were occasionally commissioned when asked for by the D.M.S. but were not included in medical units unless they were fully qualified medical practitioners.

¹¹ In the New Zealand Expeditionary Force dentists with commissioned rank sailed with the first convoy in 1914.

ever, made till March 1915, and the officers appointed were not utilised in any definite way, nor was there any precise definition of their duties and responsibilities.¹² Not till late in 1915, when the dental standard for Australian recruits had been lowered,¹³ and the Australian camps were overflowing through the great recruiting drives, was definite provision made for using this Dental Reserve in connection with the camps.

On 19th October 1915, the establishment was increased to provide for 158 officers including 6 captains and 2 majors. Next day a principal Dental Officer was allotted to the staff of the D.G.M.S. in Melbourne and a "Senior Dental Officer" appointed both in New South Wales and in Victoria—as they were also later in the other States. Some of the officers were detailed to serve for periods in the training camps and certain *full time* officers were allocated permanently in the most important of them.

In the 2nd Military District, for example, (Colonel Marshall reports) between 30 and 40 dental officers were detailed for duty half day per week. Later it increased to a full day per week. The whole of the Dental Hospital, including equipment and staff, were now placed at the disposal of the military authorities, who formed it into a Base Hospital for the dental treatment of the soldiers in camp. 20 staff-sergeant mechanics with one warrant officer and orderly and four lady attendants, were appointed full time. Dental officers were also appointed to the following camps—Liverpool, Marrickville, Showgrounds, Cootamundra, Bathurst, Goulburn, and Newcastle. The cost of material, etc., was now paid from military funds and several donations from the Walter Hall Trust. The chief trouble which had to be contended with at the Dental Hospital was the difficulty of getting the men paraded, the result being that many were sent away without their dentures.

Early in 1916 the establishment was increased to provide for

¹² The officers of the dental reserve in the 2nd Military District were sent out for training in stretcher drill—and claimed to have achieved no little proficiency in this branch of medical work.

¹³ In June, 1915, the following amendment was made of standing orders as to the dental fitness necessary for enlistment in the A.I.F.:

"The acceptance or rejection of a recruit on account of loss or decay of teeth will depend on the *consideration of the relative position of the sound teeth* and the physical condition of the recruit; thus, the loss of many teeth in a man of indifferent constitution would point to rejection, whilst a robust recruit who had lost an equal number might be accepted. (*Too much attention cannot be paid to this latter point*)"

Men might be admitted if they had serviceable incisors and any opposing molars, or serviceable incisors and opposing canines and bicusps on the same side; or serviceable incisors and canines in both jaws, and well fitting permanent sets of false teeth (*upper and lower*); or complete upper set with serviceable lower natural teeth.

"Recruits otherwise fit but whose teeth are not up to standard may be passed if they can by dental treatment be made fit. The necessary dental treatment will be provided by the Department after enlistment".

168 officers,¹⁴ 5 warrant officers and 163 staff-sergeants and by May it provided 4 majors, 54 captains, 116 lieutenants, 7 warrant officers, 170 staff-sergeants, 8 corporals (clerks) and 170 privates. Major T. F. W. Hall was Staff Officer for Dental Services on the staff of the D.G.M.S. in Melbourne and was later made a lieutenant-colonel. The Senior Dental Officers were on those of the P.M.O's in each military district. Lieut.-Colonel Marshall writing in 1918 says:

Lieut.-Colonel Hall computes that, on a conservative estimate, 75 per cent. of the men who enlist require dental treatment. It is seldom that a recruit has a perfect set of teeth, while the great majority have teeth missing or are affected by some wasting disease like pyorrhoea. Recruits are divided into three classes: the first requiring no treatment; the second, modified treatment; and the third, extensive treatment. In this third class are men who, while dentally unfit for war service, are capable of being made fit. Earlier in the war period men without a certain number of teeth were not accepted for service, but now complete sets of false teeth are often supplied to the troops. The number of those men who, in the twelve months ended 30th June 1917, were made dentally fit, but would otherwise have been unfit for service is 22,592. There were 55,497 fillings, 127,280 extractions, 26,475 plates supplied, 3,398 plates repaired, 39,485 treatments, including those for pyorrhoea, while no fewer than 183,987 artificial teeth were used.

The growth of the Army Dental Services in Australia has assisted to foster several industries within the Commonwealth. Among these industries are the manufacture of dental chairs, lathes, vulcanisers, amalgam, and other articles for every-day use.

To return to the troops overseas. At the date of the Landing no provision had been made for a dental service for the A.I.F., but a number of officers and others who had been dentists in civil life were serving in various units. Owing to the lack of recognition very little work could be done. Even in the 1st Battalion, where a kit for Private McIntosh had been purchased with £20 from regimental funds, most of it had to be left on board the transport.¹⁵

One artillery N.C.O. had enough equipment to undertake extractions in a dugout. A New Zealand dental officer, Captain B. S. Finn, worked with the 4th Australian Field Ambulance at Anzac Beach till the Suvla Bay landing; owing to the limited equipment no work other than extractions, fillings and gum

¹⁴ The number of majors and captains was still the same.

¹⁵ Instructions were given that it was to be sent ashore with the third echelon of the landing force. These stores however, were never landed and the kit was eventually forwarded to Australian Base Medical Stores in Heliopolis.

treatments was attempted. Sergeant H. D. Ferguson, 12th Light Horse Regiment, another sergeant of the 1st A.C.C.S., and a few men in other units carried on. A number of extractions, and cement and temporary fillings were done.

In the 1st Field Ambulance, between August 29th and September 14th, two brothers, stretcher-bearers, treated 199 cases, doing 122 extractions, 29 amalgam fillings, 6 dressings, 30 minor operations, 2 partial upper dentures, 2 partial lower dentures, and 19 repairs. At a New Zealand depot a limited number of dentures were undertaken, but most men in urgent need of them or of other extensive treatment were sent on to either Lemnos or Egypt, whence, in some cases, after being transferred from place to place, even including Malta, they were sent back months later to Anzac with their teeth still unattended to.

The difficulties of dentistry at Anzac may be judged from the fact that a dental chair consisted of the side of a dugout with a pack as headrest; the "dental surgery" itself was sometimes only a few yards behind the front line.¹⁶ Most operations were carried out in the operator's so-called "leisure" moments when off duty in the front line, or on fatigue work.

The small dental equipment of the 1st A.C.C.S. had been left at Lemnos, and extractions were done without either local or general anaesthetic. Eventually, when the kit did arrive, quite an amount of conservative work was put through. On one occasion when the dentist there was carrying out an extraction, a shrapnel bullet struck him on the knee.

Even in August when the 2nd Australian Division arrived, no establishment had been made for dental officers to accompany any units, and any dental work was carried out by men in the ranks, in the same manner. The 5th Australian Field Ambulance had three men who were registered dentists in Australia, and had obtained (with £30 from the Red Cross) an outfit sufficient for all kinds of dental work. As soon as news of this spread men in extreme need flocked to its position at Waldron's Point, on the extreme left flank of the Australian position. Owing to the conditions, especially scarcity of water, urgent fillings and

¹⁶ For example, about June, Cpl. W. C. Mitchell of the 7th Light Horse Regiment utilised a dugout made from biscuit tins, facing Shell Green; here he did practically all classes of work until material gave out. In July, McIntosh was sent to Egypt in search of his dental equipment but owing to difficulties in procuring a movement order for return, he could not return to Anzac until October.

extractions only were undertaken. After two weeks the ambulance moved to Rest Gully at Anzac, where conditions were much better; dental quarters were in a corner of a sandbagged shelter. The unit's carpenter built a dental chair. Dental operations were confined to hours not occupied by stretcher-bearing. Patients were drawn from all ranks.

After a weary day's duty of stretcher-bearing and fatigues (writes one of the dentists) one would limp back to one's dugout and endeavour to scrape together a meal from such items as bully-beef, bacon fat, and biscuits. No sooner would an indigestible pancake be half-cooked, than a call from the depths of the gully would drag you from the interesting occupation, in order to attend to the wants of a number of men in need of dental treatment.

During November and December 60 repairs to dentures, 180 fillings, and 327 extractions were done.

Ulcerative gingivitis (or trench mouth) appeared on the Peninsula at an early date, but no specific means of combating it were available—the only drugs procurable were tincture of iodine, potassium permanganate and hydrogen peroxide. In most cases, tincture of iodine was employed, but this did no more than perhaps check the progress of the disease. Severe cases led to greatly diminished powers of resistance on the part of the persons attacked.

Undoubtedly on the Peninsula a vast amount of dental work could have been carried out had it not been for the ever-present unsurmountable difficulty of obtaining dental stores. Indents for fresh supplies were forwarded to Lemnos and Egypt, but no stores arrived until a few days before the evacuation in December.

The diet at Anzac was undoubtedly such as to test a man's dental equipment to the utmost. The army biscuit was found by many to be a hard nut to crack. But above all, the circumstances at Anzac were peculiar in that it was essential that every man able in any degree to take his place in the firing line was required there; and that this need existed over a long period; and that facilities for evacuation were limited; and finally, that even when he was evacuated there was no provision of any adequate kind at the base for dental attention to enable him to be returned within a reasonable time.

The official records of Colonel Howse, then A.D.M.S. of the

1st Australian Division, show that Australian medical officers well recognised the urgent need. A memorandum from Colonel Howse in June says:

About 50 cases have been cleared on account of broken dentures and after an absence of 4 or 5 weeks in Mudros or Alexandria some of these have been returned to duty without having received any dental treatment. They have been much improved by dietary but on return to the ordinary (war diet) again become unfit for duty.

In Egypt the situation was that reinforcements arriving from Australia were in many cases found dentally unfit, and could not be included in the drafts to Anzac, where they were urgently needed. The allotment of two New Zealand dental officers and a few men to the Australian hospitals in Cairo was totally inadequate to cope with more than a very small amount of the work required. Dental unfits among men evacuated from Anzac, either from dental unfitness, or, more commonly, from other diseases, were accumulating in larger and larger numbers. Many of these men were so anxious to get back to Anzac that they spent large sums of money for often inefficient work by civil practitioners. Others used the plea, justified or otherwise, of dental unfitness to excuse an unjustifiable reluctance to return to their duty. At Lemnos as yet (and also at Malta where an increasing number of convalescents and dental unfits were accumulating) no dental work worth speaking of was done.

The report of Lieut.-Colonel L. S. Dudgeon, member of the British medical advisory committee, who visited Anzac and Lemnos in the last stage of the campaign, says:¹⁷

The general opinion of all acquainted with the health of the Australian troops is that the condition of their teeth is unsatisfactory. This opinion is confirmed in each Australian Division which I visited—in fact there is very considerable dental work required in the whole of the Anzac Area with the exception of the Indian Brigade. The examination of the teeth and gums of a portion of the first Australian Division who were resting at Sarpi Camp, Mudros at the end of September showed that a very large number of the men required urgent attention, while others of the same division with a total strength of 437 were also resting at the same camp at the end of September. The M.O., Captain Wentworth Thompson, informs me that he examined 378, of which a very large proportion had broken dentures, decayed stumps, oral sepsis, and teeth which otherwise required attention. I examined 35 from the trenches and

¹⁷ This was dated 24 November 1915, signed by Wm Hunter, Col A.M.S., G. S. Buchanan, Lt-Col R.A.M.C., and Leonard S. Dudgeon, Lt-Col. R.A.M.C., and after the suggestion at the end was minuted: "This policy will be carefully considered."

firing line in the Australian Divisions taken at random, of which 19 had either broken plates or decayed stumps or other defective and septic conditions of the mouth. At the present moment there are four dentists and four mechanics employed at Anzac, who are unable to meet the demands required of them. It is proposed to have four more dentists and mechanics, but it is worthy of consideration whether a sufficient number of dentists and mechanics could not be attached to the A.D.M.S. of each division. These facts are of importance, as it is obviously impossible to maintain the health of the troops when such septic conditions of the mouth exist, while treatment in the division or area to which the man is attached has much to recommend it.

Only when Colonel Howse's urgent appeals through Surgeon-General Babbie caused the War Office itself to take up the matter with the Defence Department had the authorities in Australia set about the rectification of the position overseas.

Towards the end of June 1915, demands both in Egypt and Anzac for proper provision became so urgent that action by Australia could no longer be deferred. On July 6th the Government authorised the appointment of 14 dental officers, 12 mechanics and 13 privates for service in the A.I.F. overseas. Six of the officers and a proportion of the other ranks were to be appointed from troops already in Egypt. These dentists were to be employed in units (officer, mechanic and private) attached to General Hospitals. The equipment provided for these units was a fairly complete one, though it was on no definite scale, and was not, as a matter of fact, distributed until work commenced in Egypt.¹⁸ The Dental Service was definitely initiated as a part of the Army Medical Service. This principle, Colonel Marshall states,

has remained, and been recognised, throughout, and has undoubtedly been a source of strength and of mutual benefit to both services.

Major Down, one of the first six officers selected in Australia contributed in 1917 an interesting account of the building up of the original service.

During the second week of July 1915, a meeting was held in the office of the D.G.M.S., Melbourne, to discuss what equipment was necessary and its immediate supply. The hopeless want of previous consideration that had been bestowed upon the venture, was very apparent at this meeting, and was a very real index to the obstacles that lay in front of

¹⁸ The uncertainty as to the exact status of the Service was shown by the fact that the personnel were in some States equipped as mounted, in others, for dismounted service.

the six elected officers, before they could hope to place the Service they had entered on a footing sufficiently sound to enable them to carry out the work they had undertaken to do. An equipment was at last secured and six officers, one from each State, with the rank of honorary lieutenant, with six staff-sergeants and six orderlies, sailed for Egypt on or about July 17th 1915. A surgery was opened on the transport conveying the dental personnel and a fair amount of useful work was carried out before reaching Suez. On arrival at Suez the unit and equipment was handed over to the S.M.O., A.I.F., then Colonel Ramsay Smith, who through his deputy Lieut.-Colonel Barrett disposed of the units in the following manner:

Lieut. Marshall was ordered to report to No. 3 A.G.H., Lemnos.
Lieuts Molle and Terry were attached to No. 1 A.G.H., Heliopolis Palace Hotel.

Lieut. Day was posted to Mena House.

Lieut. Down was posted to No. 1 Auxiliary Hospital, Luna Park, Heliopolis.

Lieut. Douglass was posted to Zeitoun Camp.

There were then four additional officers appointed in Egypt, who were posted as follows

Lieut. Wright to No. 3 Auxiliary Hospital.

Lieut. Pascoe to No. 2 A.G.H., Gezireh Palace.

Lieut. Blogg to Helouan Convalescent Hospital.

Lieut. Vernon was ordered to proceed to England to be attached for duty to Harefield Park Convalescent Hospital, then being established.

It was found that the amount of work to be done was stupendous and within a week of the arrival of the Corps in Egypt, all the units were toiling against impossible odds to cope with the more urgent cases that paraded to them for treatment. At this period there was no organisation of any description and although the dental officers, both individually and collectively placed their views before the Staff Officer for Medical Services, no attempt was made to reduce the state of chaos, then reigning, on to a definitely organised basis.

Before the end of 1915 Surgeon-General Fetherston visited Egypt to investigate all matters pertaining to medical services, and in an interview with Lieut. Down certain propositions in regard to dental services were placed before him, the main features being—

- (a) A necessity for immediately increasing the number of dental units.
- (b) The urgent necessity for the appointment of a responsible head of the department.
- (c) The necessity for the appointment of an officer, especially qualified to act in the capacity of quartermaster.

The first of these suggestions was given consideration, and ten more officers were appointed. The third suggestion was immediately taken up and Lieut. Unsworth arrived in Egypt in December 1915 as Quartermaster Dental Services, and immediately took over duties of purchasing supplies and issuing as required to dental officers. This appointment marked the first step in respect of the proper organisation of the dental services.

The second and most important suggestion was resolutely turned down, with the result that the dental services continued to be administered by a medical officer to the end of the period in which the A.I.F. remained in Egypt. There is reason to believe, however, that the question of the formation of a Dental Corps under separate administration was discussed by General Fetherston, when in London, but the D.G.M.S. Surgeon-General Sir Alfred Keogh did not look upon the proposition as placed before him with favour.

The strenuous nature of the work and the severity of the climate soon made inroads on the limited personnel with the result that before the end of 1915 two officers had been invalided back to Australia—Lieuts. Molle and Terry. The work at No. 1 A.G.H. then devolved on Lieut. Down, and the O.C. of the hospital, Lieut.-Colonel Newmarch, personally sought the appointment of more dental officers. He was informed however by Intermediate Base, Cairo, that an establishment had been laid down and could not be exceeded, and no more officers could be appointed until the sick officers referred to had been permanently invalided out of the Service. Thus again was the inelasticity of our organisation made manifest. Colonel Newmarch however was convinced of the necessity for the appointment of more dental officers, and interviewed Surgeon-General Ford, D.M.S., Egypt, on the subject. Mainly as a result of this interview several additions were made to commissioned rank in the Dental Corps.

It was frequently pointed out to the medical authorities that the bulk of the work being executed in Egypt was for troops then undergoing training, and should be attended to by posting dental officers to the various training units, instead of concentrating the work in the General Hospitals, thus taking up room more urgently required for casualties arriving from Gallipoli.

Up to the end of 1915, there was no possibility of dental officers making a serious attempt to save teeth by conservative treatment, as the small amount of work that could have been encompassed by the then few operators would not have in any way alleviated the congestion. A definite attempt was made however to extract all seriously decayed teeth and to supply suitable dentures to take their place.

Of the work in Egypt one of the dental officers, who succeeded a New Zealand officer and a light horseman previously working at No. 1 A.G.H., says:

From the beginning, nothing but trouble seemed to overtake our efforts, due to lack of organisation and sympathy from all concerned. Our equipment was inadequate, our supplies irregular and at times impossible to secure; our staff was too small to cope with the number of troops who were streaming in for treatment. No one at the head of affairs would take any responsibility for our maintenance and future provision.

The equipment brought from Australia was hurriedly put together without any sealed pattern for a guide and though it proved sufficiently complete for the rather radical treatment meted out to A.I.F. units in Egypt it fell far short of the care-

fully thought out and skilfully packed field equipment later issued from British ordnance stores. A dental parade of some 200 patients reported daily at No. 1 General Hospital.

On the work done at that hospital between September and the end of 1915 Lieutenant Down reported:

By far the greater number of patients are from camps outside and hospital patients and staff requiring attention are delayed in consequence. . . . Patients are blocking up the passages all day and causing a great amount of dirt and untidiness that should not exist in a General Hospital.

There are now 3 dental officers attached to the hospital. The time of one officer is nearly fully taken up with ward work and administrative duties, and another is mostly employed supervising the prosthetic branch of the work. This leaves practically only one officer to attend to the ever-increasing parade.

In the laboratory there are now 4 staff-sergeant dental mechanics and 5 orderlies and with the restricted accommodation available the laboratory becomes almost unbearable for the greater part of the day.

There has been a great deal of sickness in the section brought about chiefly through overtaxing themselves. . . . During part of the period recorded the work was being carried out by one officer.

The task can be judged from the appended figures.

Summary of dental work at No. 1 Australian General Hospital,
Heliopolis, 11 Sept. to 31 Dec., 1915.

Extractions	4,866	Dressings	824
Amalgam fillings	635	Crowns	23
Cement fillings	107	Dentures	487
Root fillings	280	Repairs	301

Cases treated, 7,473.

It soon became evident that the establishment of mechanics in each dental section was insufficient to cope with the possibilities of the work of one dental officer. This was rectified later on.

The great number of extractions was due not to any lack of recognition of the vital importance of conservative dentistry, but to the impossibility of keeping pace with the work. It is undoubtedly true that many thousands of teeth were removed with the greatest reluctance by the dental officers, through nothing more than sheer inability to find the time to do what they knew was the correct procedure.

In the A.I.F. ulcerative gingivitis was noticed at No. 1 General Hospital, Heliopolis, but it is safe to state that the dental officers though interested in a rather rare disease little thought of the important rôle this disease was later to play.

Early in November, as the result of General Fetherston's visit, six more dental units were formed, in Egypt and Australia. and the appointment of Lieutenant Unsworth, the Quartermaster, had good results in view of the extreme difficulty of securing sufficient and suitable stores.

As there had been no previous dental service Unsworth had little to guide him in the matter of supplies. All useful stocks in Cairo and Alexandria were requisitioned. The shortages, such as chairs, cabinets, flasks, plaster, had to be manufactured in Cairo. Plaster of Paris gave considerable trouble. A local firm was consulted about manufacturing the article. Gypsum was known to be deposited about 80 miles out in the desert. A sample, burnt, ground, and tested, answered the purpose to within about 10 per cent. It was very hard to obtain as the marauding desert tribes scared the camel-men. Eventually a fair supply was obtained, burnt and ground in a brickyard at Wadi Halfa, and after packing in kerosene and petrol tins was brought down the Nile in feluccas to Cairo. This compared very favourably upon analysis with third grade English plaster.¹⁹

Lemnos, 60 miles from Gallipoli and used as a base, was an ideal spot for opening up a dental clinic to attend to the troops passing through and stationed on the island. In
Lemnos the earlier half of the campaign some dental work was being done by a member²⁰ of the staff of No. 1 Stationary Hospital in East Mudros. But no serious amount of work was undertaken until the 3rd Australian General Hospital landed in August 1915.

When this hospital was in England (to which it had gone direct from Australia) a dental unit had been formed in it in response to a cable from Australia, which was now establishing the dental units. Three members of the hospital personnel were selected, one promoted honorary lieutenant, one staff-sergeant (dental mechanic), and one attached as orderly. In England two complete equipments were purchased with Red Cross funds. They were complete including two pump chairs and large cabinets. At Lemnos a weatherboard hut was built, subdivided

¹⁹ Even the buying up of all dental supplies in Egypt did not relieve the shortage, and supplies sent from Australia and England did not arrive until most of the dental units, with the exception of the Light Horse units, left Egypt in 1916.

²⁰ Sgt H. S. Marshall Visiting the hospital in June, Sir Ian Hamilton was greatly impressed by the importance of this work and issued instructions that such assistance as was possible should be given by the base depot in the provision of dental supplies.

3RD AUSTRALIAN GENERAL HOSPITAL, LEMNOS

1915.	Patients.	Extrac- tions.	Treat- ments.	Scalings.	Amal- gam.	Cement	Tempor- ary.	Syn- thetic.	Root.	Den- tures.	Re- pairs.	Crowns	Gen- eral Anæ- sthetics.	Gutta Percha.
September .	82	8	37	7	25	3	19	6	—	1	1	—	—	1
October ..	129	12	27	5	28	21	28	9	—	4	—	—	—	—
November .	161	38	89	8	46	11	37	16	12	1	2	—	—	—
December .	201	21	108	13	65	21	45	20	10	9	8	2	—	—
Total ..	573	79	251	33	164	56	129	51	22	15	11	2	—	1
AUSTRALIAN IMPERIAL FORCE														
September .	670	459	215	5	156	101	110	22	—	17	39	3	58	1
October ..	987	520	140	16	386	240	108	33	—	46	79	1	5	—
November .	511	392	201	6	75	60	71	27	22	6	16	—	1	—
December .	1,299	740	453	29	267	221	256	31	35	49	33	10	1	—
Total ..	3,467	2,111	1,009	56	884	622	545	113	57	118	167	14	65	1
NEW ZEALAND EXPEDITIONARY FORCE														
September .	96	58	27	2	28	7	26	8	—	3	6	1	—	—
October ..	355	227	49	2	123	60	28	11	—	9	35	10	—	—
November .	98	69	31	2	17	16	5	5	1	5	12	—	—	—
December .	23	3	10	2	3	1	3	—	1	3	1	—	—	—
Total ..	552	357	117	8	171	84	62	24	2	20	54	11	—	—
IMPERIAL FORCES														
September .	545	629	155	7	105	62	55	21	—	18	18	1	38	—
October ..	386	324	58	8	52	43	23	27	—	22	27	3	6	—
November .	436	380	102	17	45	26	42	14	10	12	10	2	6	—
December .	330	196	107	13	47	31	40	16	15	9	13	5	2	—
Total ..	1,691	1,529	422	45	249	162	160	78	25	61	68	11	52	—
Grand Total ..	6,283	4,076	1,799	142	1,468	924	896	266	106	214	300	38	117	2

into two surgeries, 10 ft. x 8 ft. and a workroom, 20 ft. x 16 ft., the passage between being used as a waiting room. The floors were concrete. Water was supplied. Glass was unprocurable but white calico kept out rain, dust and flies. Pending the completion of the dental hut, urgent operations were carried out in the hospital dispensary with the aid of a small travelling equipment.

Towards the end of August, another dental unit arrived for the hospital. As its officer (Lieutenant F. Marshall) had brought a complete equipment from Australia, three outfits were now available and were put into use.

From September 4th, when the hut was opened, the dental staff was besieged by patients from the hospital, and from the many naval and military units around Lemnos, as well as Egyptian, Greek and Maltese Labour Corps and Turkish prisoners of war. At the end of October the two dental officers were admitted to hospital with paratyphoid, and one of them was evacuated to England. No reinforcements had arrived except one staff-sergeant, but the staff-sergeants, who were qualified practitioners, carried on. The work done at Lemnos in this hospital is shown in the figures appended.²¹

From Gallipoli men were also evacuated sick and wounded to England. There an Australian civil practitioner (who was afterwards commissioned in the Australian Army Dental Service) worked at first at the **England** Australian Convalescent Hospital at Harefield. In August 1915, two honorary lieutenants were appointed in Australia and Egypt to be attached to that hospital and other appointments were later made to the Auxiliary Hospital at Abbey Wood. One of these officers says:

The dental condition at this time was deplorable; the majority had not had an opportunity of receiving any dental treatment for many months, mainly owing to lack of attention to oral conditions during their stay in English hospitals. Pyorrhoea and ulcerative gingivitis were much in evidence; and I venture to say that 70 per cent. of the patients passing through our hands for the period October 1915-March 1916 suffered from such. In addition there was a considerable amount of fracture and restoration work; . . . it was not unusual for men to present ununited fractures of some months standing, for which no mechanical appliances had been adjusted.

²¹ No jaw surgery was seen. Cases of ulcerative gingivitis were soon noticed. Canadian hospitals there also had dentists, but their equipment was late in arriving. A table of the 1st Division at Sarpi Camp at the end of September showed that 607 men urgently needed dental attention, including 409 "bad cases".

About September 1915, arrangements were made for dental work to be carried out also at the Australian and New Zealand Base Depot, Weymouth, by a sergeant and several attached men from infantry units.

In December 1915 and January 1916, the Australian troops returned to Egypt from Gallipoli. The appointment of a largely independent D.M.S., A.I.F. in the person of **Reconstruction in Egypt** Surgeon-General Howse in November 1915, allowed the centralisation of the administration, and the establishment of responsible authority, for co-ordinating the work of the dental service with that of the rest of the A.A.M.S. It was the lack of this that had hitherto proved the greatest bar to an adequate provision for the dental needs of the troops. The reorganisation of the A.I.F., under General Birdwood, and the increase from two and a half infantry divisions to five, which presently served on the Western Front, and the Light Horse, which served in Palestine, has been described many times in these pages, and only the effects on the dental service need here be referred to.

At this juncture there was carried out a thorough overhaul of all Australian troops as regards physical condition. Each Regimental Medical Officer held parades of his whole unit, now at full strength, and submitted lists, sometimes of hundreds of men, requiring dental treatment. The dental sections were distributed among dental hospitals and in the training camps, and under the new conditions of personal administration and of rapidly improving organisation, the work was carried out along lines infinitely more satisfactory than hitherto.

The dental reforms were largely based on a report made for the D.M.S., by the quartermaster. Among other things he pointed out that:

No standard of work is now observed. Some sections are carrying out the treatment most suited to conditions, whilst others are going in for high class, conservative dentistry.

There is a large number of dentists now serving with the Australian Imperial Force in Egypt, who are not on the strength of the Dental Corps. Also, there are dentists with various field hospitals and field ambulances. These details should be investigated, and where possible, the men transferred to this corps.

Lieutenant Unsworth added that

the sections were overworked and that there were no field dental sections, and it was most desirable that there should be.

Accordingly fourteen more dental units were created in Egypt, the officers and other ranks being obtained from other arms of the service. In February and March 1916, four more were formed, and other units arrived from Australia, bringing the total number of dental officers in Egypt to 39, including the quartermaster with an equivalent number of other ranks. This number was never exceeded in Egypt.

The first 36 dental units were complete and equipped and, by 14th April 1916, had been allotted as follows: General Hospitals—three; Auxiliary Hospitals—four; Dermatological Hospital—one; Convalescent Depots—two; Stationary Hospitals—two; Casualty Clearing Hospitals (*sic*)—one; Field Ambulances—twelve; Light Horse Field Ambulances—three; Training Bases—eight. The base depot of medical and dental stores was at Heliopolis.

In March, after a tussle with the British officers controlling the transport to France, who had no authority to allow dental units to accompany field ambulances, General Howse managed to get his dental units shipped with their divisions for the Western Front. *This was the first time on record that any dental unit was allowed by the British authorities to go to France as a recognised part of a field ambulance personnel.*

Every dentist who left Egypt with the A.I.F. was supplied with a complete field equipment and sufficient supplies of materials to carry him over six weeks or two months.²²

The chief reforms and procedures initiated and officially recognised by March 1916, may be epitomised as follows:

- (1) Dentists A.I.F. all to hold commissioned rank as dental officers.
- (2) Only registered dentists to be dental officers.
- (3) Base hospital dental kits and field equipments standardised.
- (4) Expendable materials standardised.
- (5) Dentists attached to general hospitals, field ambulances, stationary hospitals and casualty clearing stations as part of their personnel.

²² About March, 1916, also Gen. Howse proposed to Australia that the organisation of a dental unit should consist of one officer, two staff-sergeant mechanics, and one dental orderly, but it was not for some time that this was approved.

- (6) Dental stores with quartermaster established from which stores were issued. This department was made a separate and distinct accounting unit, for both purchase and issue of dental supplies.
- (7) Personnel of dental units fixed at one officer, two staff-sergeant mechanics and one orderly.
- (8) Weekly return forms of work done instituted.
- (9) Forms for recording work done were prescribed and issued to units in book form for surgical and mechanical work.
- (10) 39 dental units fully equipped in the field.

III

THE WESTERN FRONT

As to the provision of dental service for the British troops on the Western Front the *British Official Medical History* says²³ that, during the Battle of the Aisne, in

September, 1914, it so happened that Sir Douglas Haig, in command of the First Army, suffered severely from toothache at a time when all his energies were required for the battle. The immediate needs were met by bringing a civilian dentist from Paris to Fere-en-Tardenois. He remained there for three days and treated several cases. In consequence of this incident a telegram was sent to the War Office asking for the provision of dental officers, and dentists began to arrive and were attached to casualty clearing stations before the British troops had left the Aisne.

When the Australians reached France in April 1916 the only British dentists in Army areas were still those thus attached, one to each casualty clearing station. For artificial teeth and all mechanical dental work men had to be sent to the base. Many commanders at the front had, however, arranged that the dentists at the casualty clearing stations should on certain days of each week visit the divisional areas with an ambulance car. In May 1916 the Army was offered through the Red Cross a motor dental laboratory, presented by private subscription. This proved a model for four others—one being presented for each Army. These brought some mechanical dentistry into the forward areas.²⁴ An advance upon this—the formation of a centre round each laboratory—was suggested by the medical directorate in March 1918, but was rejected by the Adjutant General. But the provision for dental attention in the British Army was still in what was regarded by the oversea staffs as almost a

²³ *General, Volume II, p 308*

²⁴ Small dental centres eventually grew up around them. The First and Second Armies had also their own dental centre at St. Omer.

"hopeless" position when the war ended. The *British Official Medical History* itself says:

Dentistry with Dominion and American troops was in a much more advanced state and on a more extensive scale than with the troops from the United Kingdom. Thus the war establishments of a Canadian division provided for a dental surgeon with each field ambulance, with each artillery and infantry brigade and with divisional headquarters, in addition to two with headquarters of a mounted brigade. The U.S.A. troops had a dentist and dental equipment with each infantry battalion. This extensive organisation for dental work had a definite influence on the British formations.

When the Australian Imperial Force, reorganised after the Gallipoli Campaign became divided in two separate forces, a dental service effectively organised and equipped accompanied each of its three parts—the **A.A.D.S.** Light Horse in Egypt, the infantry units and **1916** formations in France, and the reinforcement and details personnel assembled in the Command Depots of the United Kingdom. The service was now recognised as an important element not only in the medical service but in the Australian Imperial Force itself. The policy had been laid down by the D.M.S., A.I.F. and accepted by the General Officer Commanding that the Australian soldier should be made and kept "dentally fit" and that this duty should be as much a responsibility of the Director of Medical Services as any other element in the problem of the effective. To the achievement of this purpose there had been created an organisation unique in the history of medical service: in addition to a complete organisation at the Australian Base in England whereby all recruits (or returned wounded) should be made dentally fit, this service was to be continued throughout the whole course of his movements to the front. The most important innovation undoubtedly was the attachment of a "dental section", organised on an exact establishment and with prescribed equipment, to each field ambulance.

The dental history of the A.I.F. during 1916-18 is a record of increasing exactness in the implementing of this campaign and the principle was extended to include a vigorous campaign of administrative pressure to ensure that recruits left Australia in a reasonable condition of dental fitness. The year 1916 was indeed one of experiment and trial and error, in which mistakes

and inefficiency dominated the picture. When the Australian infantry formations went to France, and the Administrative Headquarters to England, the dental service was not represented on the staff of the Director of Medical Services by a dental officer but was controlled by an A.D.M.S. Not only the dental officers themselves but the A.D.M.S. responsible for the control of the depots found that the dental problems were such as could only be solved with the assistance and advice of a dental officer.

During this year dental officers at the depots in England and elsewhere could see that the object—of ensuring that none but fit men reached the front—was not being attained but because the organisation was still rudimentary they could not prevent it; and General Howse, having no dental officer on his own staff, also was slow in grasping the opportunity to stop this leakage. The A.I.F. was now fairly well supplied with dental units. By the end of August there were in France 16 units, (three for each of the four Australian infantry divisions then there, two at the casualty clearing stations, one at No. 2 A.G.H., and one at the Base Depot at Etaples); 48 in England, mainly at the training and convalescent (or "Command") depots; and 6 in Egypt (three with Light Horse field ambulances, and one each at No. 14 A.G.H., No. 2 A.S.H., and the training depot). The dental units in England were relied upon to ensure that no dentally unfit man reached France.

They were not, however, given the power to do so. An order of 28th August 1916, for example, laid down that:

Officers and men for dental treatment will in the first instance see the medical officer of their *unit*. Dental treatment will *not* be given except on recommendation of the medical officer.

The dental officer had no right to determine which men did and which did not require treatment; he could not order troops to parade for dental examination. Further, through lack of dental staff to formulate and control policy, there was no recognised standard of dental fitness, nor any general system of recording the dental condition of the troops.

As almost always happened, it was through military urgency that the necessary changes were brought about. The immense losses at Pozières in July and August 1916 caused a most pressing demand for reinforcements, but sufficient reinforcements

were not forthcoming. The A.I.F. leaders and War Office made demands on Australia; the Defence Department in Melbourne on the other hand pointed out that there were apparently very large numbers of troops in the training depots or elsewhere overseas. In the pressure more dentally unfit men were rushed from Australia to England. There General Howse and the staff at the Base adopted every means they could devise to make the convalescents and the new drafts fit for sending to France.

It had been noted very early in the campaign in France that many soldiers were being evacuated from the line because they had not sufficient teeth with which to maintain nutrition on the limited diet obtainable in the forward areas. On July 4th the Australian dental officer, Captain Down, at the base depot at Etaples pointed out to the British D.D.M.S. there that great numbers of men were held up there as temporarily unfit awaiting dentures. After conference with the D.D.M.S., Down reported on August 16th that 500 Australians of the 1st Division alone were thus held up, and presumably an equal number of the 2nd, 4th and 5th. As the British dental clinic there had also over 1,000 men waiting, it could give no help. He accordingly recommended that 5 Australian dental officers and 10 mechanics should be sent at once to the Australian Depot; and further that the system of recording in force at the British dental clinic should be adopted.

The scheme was approved and General Howse at once sent the five units asked for. But the fact that the Australian soldiers in the Etaples depots, most of whom were drafts from England on their way to the front, were held up for dental unfitness, argued that the system of dental control at the depots in England was far from efficient. Actually the trouble largely lay in the fact that the military and medical officers at the depots at this time were especially concerned with their duty of getting the men there forwarded to the front at the earliest possible moment, and as they, and not the dental officers, determined what men should be dentally inspected and who was fit for service, numbers of dentally unfit men were passed, only to be held up at Etaples, where men convalescent from hospitals in France also were received.

In England, some of the suggestions put forward by dental officers to remedy these defects were, at this stage, adopted. In

September a weekly report was required in certain forms from all dental units, and in November the second sergeant-mechanic, authorised about a year before, was at last appointed to each unit. On November 11th an order was issued that all troops arriving at the Australian depots in England from Australia or from anywhere else—

will be paraded at the medical inspection room for inspection by the medical and dental officers during the first day in camp.

The C.O. will furnish the R.M.O. with a nominal roll of these men . . . and will be responsible that all are paraded for inspection.

On inspection the R.M.O. will make entries on the roll indicating which men are completely inoculated and vaccinated, dentally fit and otherwise fit for general service. For others, vaccination and inoculation, and dental treatment will be instituted forthwith.

The dates of completion of these measures and of fitness will be subsequently entered by the R.M.O. and initialled when the soldier becomes fit for general service.

This nominal roll will be preserved by the R.M.O. as the record of fitness or otherwise of the men of the unit.

No man will be sent overseas unless his record shows that he is complete medically and dentally.

The dental officer had to record on the nominal roll each man's dental condition. But in spite of this great improvement the order still left in the hands of the R.M.O. the decision whether a man was dentally unfit. Colonel Marshall comments:

The weak points of the scheme were three:

- (1) No provision was made for a final inspection and certification by a dental officer.
- (2) The R.M.O. alone still held the power to strike a man off draft.
- (3) No standard of dental unfitness was laid down.

Under this scheme the dental officer kept a nominal roll of all men in the battalion and as each man received the attention necessary he was marked as dentally fit. The M.O. on the final draft inspection would use the roll as his guide to dental fitness. It often came about that men became dentally unfit after having been made fit; in some cases a broken denture would render a man ineligible for draft even although he had been completed only a few days beforehand; such a thing as an alveolar abscess would be quite sufficient to make a man a casualty, and the only way to overcome the trouble was to parade the troops before a dental officer prior to marching out.

At this time the only authority in the nature of a dental staff officer was the quartermaster, Lieutenant Unsworth, who had been ordered to inspect the dental units in England from time to time, and who was thus able to draw General Howse's atten-

tion to the disadvantages under which they were working. But Lieutenant Unsworth, though he had been associated with the dental profession for many years, was not himself a member of it. He realised that he was not qualified to advise on matters other than those of organisation, and himself urged General Howse to appoint a dental officer as his adviser. Not only was supervision required but the dental officers had little confidence in purely medical advisers to the D.M.S., and their contentment was in itself an object worth while. On 13th December 1916 the D.M.S. took this step, appointing as his adviser the senior officer in the service, Captain Marshall, with the rank of major.

Marshall was then working with No. 3 A.G.H. at Brighton, England, out of touch with the rest of the service and its problems. He took quick steps to remedy this defect, obtaining authority for the immediate appointment of a dental staff officer to supervise, under himself, the Australian dental units in France, while he himself, to gain close personal touch with the work in England, moved first to A.I.F. Administrative Headquarters at Horseferry Road and then to Tidworth, headquarters of the depots on and around Salisbury Plain. The officer selected for France, and promoted for the task, was Major L. B. Day.

Major Day afterwards wrote:

Armed with a private letter of introduction to the M.O. of the 2nd Australian Division Base Depot, and with verbal instructions to put some organisation into the Australian Dental Services in France, one set to work in a leaky tent on a snow covered hill at Etaples. I had no knowledge of what was required or what was desired, not even knowing how to write an official memo, possessing no explicit directions, in fact I had nothing but personal kit.

But his endeavour to work from Etaples was checkmated by the fact that the British authorities controlling transport in France knew little or nothing about him or his position. He was unable to get to the units, as he was intended to do, until in April 1917 he managed to get approval for his attachment to General Birdwood's headquarters at I Anzac Corps. His instructions were simply "to do all in his power to help the dental units along and to act as a liaison officer between dental officers and the D.D.M.S. of the Corps". Marshall says:

The routine that was evolved out of the then existing disorganisation

became a tower of strength to the units in France and so thorough was the work carried out by S.O., A.D.S., France, that the S.O., A.D.S., A.I.F., London was relieved of a vast amount of detail that was safely left in the hands of the S.O., A.D.S., France.

At the depots in England the system was still defective in that even those men who were marked as dentally unfit were not compelled to parade for treatment. It is true that their medical officer was empowered, and indeed had (since December 20th) been required, to parade them for treatment and to ensure that no man "medically or dentally incomplete" should be listed for draft to the front. But the dental officers who were supposed to render the troops dentally fit had no power to call them up for treatment. Major Marshall was now able to bring about steps that transformed the position. The chief one was the issue on 28th February 1917 of an order—*G.R.O. 2232*—giving dental officers at the depots the power to ask for men to be paraded and requiring the unit commanders, on receiving a day's notice, to parade any man named by their dental officer, and to ensure that no other duty prevented the man's attendance.

G.R.O. 2232 (says Marshall) was the most effective instrument ever placed in the hands of the dental officer. . . . After the promulgation of this order dental officers could demand the compulsory parading of all troops in the Battalion. By working in close co-operation with O's.C. and adjutants the dental officer was enabled to so order his parades that no hindrance to the course of training resulted. The musketry course was one that presented some difficulty as any breach in its continuity necessitated a fresh start. It was usually arranged that men undergoing this course were not called up for treatment until they had completed it, provided that all necessary extractions were completed beforehand. No such arrangement was necessary with the other courses, men for treatment being called up at times suitable to the dental officer.

Marshall's second task was the setting up of a standard of dental fitness. From the medical side came some criticism, reflected in the following letter written at the beginning of 1917 by Captain J. P. Fogarty, senior medical officer at Codford.

Dental officers have a tendency to confound what I would term "socially unfit" with "militarily unfit", a tendency to brand every man as unfit who requires dental attention, without due regard as to whether his dental insufficiency amounts to depreciation of the man as a soldier. Men are thus branded unfit who for years in civil life have been carrying on with their mouths in the same state and have enjoyed the best of health and are in good physical condition. I think this misinterpretation of "dentally unfit" is likely to exist not only in England but also in France,

as so few dental officers have had opportunity to become familiar with the dental requirements of the line. If one is not at present in operation, could not some definite standard or standards be drawn up that dental officers could look for and in their work aim at attaining? The days of the hard army biscuit as a diet for the soldier to any extent are past, and it is only on very rare occasions that he is called upon to exhibit greater masticatory powers than he would in civil life.

The standard eventually established (according to Marshall) was:

No man was to be allowed to proceed overseas unless his mouth was free from caries or any pathological condition of the gums, or an insufficiency of teeth for adequate mastication.

A further important reform for the improvement of control was the appointment at each Command Depot (*i.e.* convalescent depot) and at each group of training battalions (reinforcements from Australia) of a Senior Dental Officer, to supervise the work of the dental units leaving the staff officer (Major Marshall) free to devote himself to larger matters of policy. Such a step was necessary if there was to be any chance of these innovations in policy and method being quickly adopted and strictly adhered to in the numerous scattered units. Eventually a dental staff officer (Major Down) was appointed to the depots at Salisbury Plain, and Marshall (then a lieutenant-colonel) returned to his proper position on General Howse's staff in London. A dental staff officer (Major Douglass) also was appointed for the A.I.F. in Egypt. Major K. Valentine Blogg was S.D.O. at the Base Depot in France. On 27th November 1917 the staff of the dental services of the A.I.F. under the D.M.S. comprised²⁵

Staff officer, A.A.D.S.	Admin. H.Q.	.. .. .	1	lt-col.
do.	do.	France	1	major
do.	do.	A.I.F. Depots in U.K.	1	major
do.	do.	Egypt	1	major
S.D.O.	do.	Base Depots, France	1	major
do.	do.	1 Command Depot, Eng.	1	major
do.	do.	3 Command Depot, Eng. and 2 Tng. Bde.	1	major
do.	do.	4 Command Depot, Eng.	1	major
do.	do.	1 Training Bde.	1	major
do.	do.	3 Training Bde.	1	major

²⁵ There were at this period 118 dental units in existence, of which 66 were in England, 35 in France, and 17 in Egypt.

"From the observations and suggestions of the S.D.O's," says Marshall, "was evolved the ultimate routine of the A.A.M.C. Dental Service."

At this time, by order from Australia, any additions found necessary to the personnel of the dental service had to be raised from men already on active service. Colonel
Reinforcements Marshall says:

This direction from the Department of Defence was adhered to in England, France and Egypt. It was not until the A.I.F. had become exhausted of any likely candidate for the dental service, that reinforcements were despatched from Australia. This ruling of the Defence Department was unknown to many members of the dental service who had been retained for service with the home forces for many months even though they had enlisted for active service.

In July, 1918, arrangements were made for regular monthly reinforcements from Australia—2 dental officers and 2 mechanics for England and one of each for Egypt. Of the mechanics received during the war from Australia, Colonel Marshall notes:

They were not always first class operators and mechanics; in certain instances, personnel had been despatched from Australia with no qualifications whatsoever. Why such men were ever permitted to join the dental service it is hard to conjecture.

Except for the quartermaster, commissioned rank in the Service was given to none but dentists; but three warrant
Promotion officers were employed at the depots to supervise mechanical work. Authority was given by the Australian Government to promote dental officers after one year to the rank of honorary captain, but it was long before it was acted upon, and it was not until 6th April 1917, that the honorary rank of all officers then in the Service was made "substantive". Clerks (mostly corporals) and orderlies were chosen from all branches of the A.I.F. but as a rule "B" class men had to be selected—not always a satisfactory system.

The conditions that at first confronted the Staff Officer for Dental Services at the depots are thus described by him:

The rolls. Though officers had been instructed to keep all records according to a definite scheme, it was found that dental rolls were in a deplorable state; in many instances they were entered upon scraps of paper and many were missing.

No fixed system had been adopted to cope with the dental units who were increasing in numbers through both a shortage of dental officers

and lack of experience on the part of dental officers. These two points were investigated by the S.D.O.'s and recommendations forwarded.

Training battalions. The S.O.A.D.S. attached a unit to each training battalion, and also saw that a *pro rata* distribution was made for the Command Depots.

Nominal rolls. All dental officers were instructed to enter the nominal rolls in a book after having made certain that this original roll was correct in every particular. The dental officer was then able to keep track of every man in the battalion provided that he was supplied with rolls of all men marching into and out of the unit. At the initial inspection, either on the medical parade or by a separate dental parade, particulars as to dental fitness would be made by the dental officer on his roll. When a man marched out of the unit his name would be crossed off this roll.

As men were held in these formations at least 14 weeks, dental officers could, by adopting a definite scheme of work, make sure that men would be dentally fit at the end of their training period. Naturally if all extractions were completed during the first week of a man's stay in the battalion, he would be in a fit condition for a denture at the expiration of his training. All other treatment could be given during this period.

Command Depots. Reorganisation of a Command Depot was a more difficult undertaking, especially in keeping a check upon all men in the depot. The population of a Command Depot was an ever-changing one; men were retained perhaps only 24 hours in the depot and then transferred to some other location; at other times a man was liable to be retained in the depot six months before proceeding overseas. Under such conditions the system originally adopted, which was identical with that of a training battalion, was found too cumbersome for the limited clerical staff employed by the S.D.O. No difficulty was experienced after the inauguration of the card system.

Under the system thus instituted it was possible for the S.D.O. at the Base Depot in France (which in June, 1917, moved from Etaples to Havre) to keep a check on the effectiveness of the dental work done in England. When any member of a draft arrived in France dentally unfit a detailed report was made of this and an explanation was sought from the dental officer who should have seen that he was fit before he left England.

The end of 1917 as we have seen²⁶ found the Allied Armies facing a supreme crisis. The war of attrition had ground down both sides. But Russia having collapsed, a great German offensive was expected and the Americans were not yet ready.

**The highwater
mark—1918**

The Australian force had its own urgent problems of maintenance. Third Ypres had taken toll of its divisions to the

²⁶ Vol. II, Chap. x.

extent of some 38,000 battle casualties,²⁷ recruiting in Australia was failing, conscription was again rejected, a drastic curtailment of the striking strength of the force was threatened. At the same time, General Howse was inexorable in his refusal to relax the "standard of fitness" of the replacements sent to France from the training battalions and Command Depots in England.

The outcome of this situation has been fully told in *Volume II*. The Australian Divisions were *not* disbanded, nor even weakened. On the contrary they were brought fully to strength in time to meet the German offensive—and that, with an augmented rather than diminished efficiency and morale; and throughout 1918 they were maintained at a strength sufficient to keep the Australian force (reinforced in the end by Americans) as the spearhead of the Fourth Army's advance throughout the terrific strain of the "last 100 days".

The part played in this achievement by the dental service has an interest beyond the service itself. The organisation and efficiency of dental work in the depots in the United Kingdom reached highwater mark in time to meet the crisis. On 22nd April 1918, the following letter was sent by the D.M.S., A.I.F. to General Birdwood, its commander.

I have the honour to bring to the notice of the General Commanding the following report on the work accomplished for the week ending 30.3.18. by the dental units attached to the 1st, 2nd, and 3rd Training Brigades:

During the week there was a demand for every man up to 10th week of training for draft; this demand necessitated the completion of dental work for some hundreds of men. On being advised of the urgency of the work the dental personnel affected gave a very ready response, and worked solidly through Easter, with the gratifying result that all men required were rendered dentally fit with the exception of about 5. These latter men were found to be suffering from some acute condition such as post extraction inflammation. Some idea of the effort put forward may be gauged from the fact that 1,862 fillings, 289 dentures, and 148 repairs, were inserted and 1,084 men were made dentally fit in the week.

N. R. HOWSE,
Surgeon-General, D.M.S., A.I.F.

Records show that the work achieved by the dental sections working with the Command Depots was in no way behind this

²⁷ The figure given in *Vol. II*, p. 245 (34,342) includes only casualties suffered between Sept. 16 and Nov. 10.

record. At the front during the same period the dental units in the field and at the Base played an important part in maintaining the field strength. A statement rendered by the S.O.A.D.S. there (Major Day) for the month ending 29th December 1917, is epitomised below: 16,812 men were treated comprising 15,016 members of the A.I.F., 1,607 British, 12 French soldiers, 28 prisoners of war, and 149 civilians.

DENTAL REPORT FROM NOV. 25TH TO DEC. 29TH, 1917.

Teeth extracted	4,206	Scaling cases	429	Dentures:	
Anaesthetics:		Dressings	2,181	Full upper	184
Local	2,834	Minor operations	1,968	Full lower	31
General	15	Ulcerative gingivitis	1,151	Partial upper	913
Fillings:		Pyorrhoea	44	Partial lower	567
Amalgam	2,249	Crowns	76	Repairs	1,820
Cement	1,778	Fractured jaw cases	23	Dentally unfit:	
Root	700			Awaiting dentures	673
Temporary	1,095			Others dentally unfit	574

By the date of the Armistice with Germany in November 1918 there were 130 dental officers serving with the A.I.F. abroad, of whom 119 were engaged in operative work and 11 in administrative capacities. This was the highest figure ever reached in the Service.

The routine finally observed at the Command Depots is described by Colonel Marshall as follows:

Routine at Command Depots. All men marching into Command Depots were paraded for dental inspection within 24 hours. Complete nominal rolls of all such men were supplied by depot orderly room to the S.D.O. either in duplicate or triplicate. The state of dental fitness was marked on these rolls as follows:

x:—extractions required.

y:—fillings required.

s:—scaling and gum treatment required.

r:—repairs to dentures required.

d:—dentures required.

g:—waiting for dentures after extractions. (A number after "g" indicated the number of weeks to elapse before the impression for denture can be taken.)

All dentures *in situ* were noted on page 17 of the Army pay book. If the pay books were not available the dental officer forwarded a copy of the required entry to the officer commanding the unit, who was responsible that it was copied into it when it became available. Entries

ADS Form 8.

(Form to be used as supplement to ADS Form I by Dental Units attached to Training Units in A.I.F. Depots in U.K.)

Return for Week Ending Midnight, Saturday,

Dental Unit No.

13562-1,000-11/18

REINFORCEMENTS FROM AUSTRALIA.

No	of men examined.....	on.....	ex Transport.....
"	"	Dentally Fit	
"	"	" Unft.	
"	"	Requiring "D".....	No. of "Yr" Required
"	"	" "R".....	" " " " " "
"	"	" "X".....	" " " " " "
"	"	" "S".....	" " " " " "
"	"	"	"

REMARKS —

No. of men examined in Overseas Draft.

No. of men struck off draft.....

No.	Rank	Name.	Date Struck off Draft	Reason of unfitness.	Has S D O. SEEN and concurred.

DENTAL UNFITS AVAILABLE FOR TREATMENT IN WEEKS OF TRAINING

Regiment		Prior to 7th week.	7th week.	8th week.	9th week.	10th week.	Perm. Cadre.	Marched in.
	X							
	Y							
	S							
	D							
	R							
Total ..								

REMARKS:—

No. of Pin Teeth used

No. of Diatoric Teeth used.....

Dental Officer in Charge.

in pay books were made in ink in neat handwriting, and stated whether a denture was upper or lower, using the following abbreviations to denote the various dentures:

F.U. Full upper. F.L. Full lower. P.U. Partial upper. P.L. Partial lower.

When a soldier refused to undergo any necessary treatment, or to have a denture, a statement to that effect was entered in his pay book. The supply of men for dental parades was arranged for by this routine:

Supposing there were four companies in the depot, four separate rolls would be forwarded to the depot orderly room where they were checked and despatched to the respective companies. The day following each company's roll would accompany its men parading and on it would be noted the reason for any absentee. At the close of each day's work, nominal rolls of all men having been made dentally fit would be forwarded to the depot orderly room and S.M.O. Whilst the men were waiting for their turn for treatment they were handed over to the physical training instructors who put them through various exercises. Treatment was confined mainly to high category men as in most cases these men automatically became "A" class when dental treatment was completed. Men medically fit for "A" class but dentally unfit were put in a separate category *viz.* "B.I.a.4"; this category was the same in all depots.

As soon as a man became "A" class he was available for draft; no men other than "A" class were allowed to proceed overseas. Officers were not removed from overseas drafts on account of dental unfitness.

Extractions were carried out as soon as the men had been examined, so as to ensure that their mouths would be in a fit condition at an early date for a denture.

Prior to a draft of fit men marching out of a Command Depot an inspection was made by a dental officer who had to certify

"I have examined all the men in the above nominal roll and they are dentally fit and all dentures *in situ* or supplied have been entered in pay books."

Finally no man was permitted to refuse such treatment as would render him dentally fit.

The drafts of fit men from the Command Depots were sent to the overseas training brigade prior to being sent overseas. Here they were again examined and if any unfit man was discovered in the draft he was struck off the roll and an explanation was asked for from the dental officer in the Command Depot who permitted the dental unfit to be included in the depot draft.

The following returns were sent weekly through the S.D.O.

1. Return of dental unfits made up from the particulars given by the card system. This enabled the S.O.A.D.S. to keep a check upon all dental unfits.
2. Nominal rolls of officers and other ranks dental service, and other ranks temporarily attached.
3. Nominal roll of officers and other ranks marching in or out of depot.
4. Weekly dental report.

Both Command Depots and training battalion drew all supplies from the Q.M. Dental Supplies at 12 Great Smith Street, London. Indents were sent monthly on the dates shown below:

<i>Group 1.</i>	<i>1st of each month.</i>
	Units at—Parkhouse, Bulford, Weymouth, Longmoor.
<i>Group 2.</i>	<i>8th of each month.</i>
	Units at—Codford, Hurdcott, Fovant.
<i>Group 3.</i>	<i>15th of each month.</i>
	Units at—Sutton Veny, Longbridge Deverill, Heylesbury.
<i>Group 4.</i>	<i>22nd of each month.</i>
	Units at—Clifton, Brightlingsea, Grantham.

Dental equipment was standardised in June 1917.

A charge of £1 was made for the renewal or replacement of a denture previously supplied at public expense unless it could be shown that the loss was not due to the fault of the officer or man concerned

In France and Belgium eventually there were 35 units and two administrative officers. The units were posted as follows:

France.

Ambulances	15
Field Artillery	5
Army Artillery	1
Casualty Clearing Stations	3
Hospitals	3
Corps Headquarters	1
Corps School	1
Railway Operating Coy.	1
Base, Havre	5
Total	<u>35²⁸</u>

At the Base Depots in France the five units under their S.D.O., Major Blogg, carried out an immense task—easily the most important dental service of the A.I.F. in France. Suitable arrangements as to discipline and attendance were made with the military authorities. The S.D.O. had to furnish the following returns:

**Base Depots,
Havre**

²⁸ Later, in 1919, units were attached to Divisional Headquarters.

Weekly return of work done

Dental units, classified.
 Troops treated.
 Gingivitis cases.
 Admissions to hospital.
 Transfers.
 Evacuations.
 Personnel.
 Leave.

For supplies indents were submitted to the Base Depots Medical Stores, Havre. No trouble was experienced as the stores were near the Base Depots.

Though the Service in the forward (or Army) areas was understaffed and overworked, conditions were easier than in England²⁹ in that dental parades were voluntary and the aim of the dental officer was to alleviate any pain or discomfort rather than to render men dentally fit: this last course was not within the realms of possibility as the distribution of dental units was as follows:

**France—
forward areas**

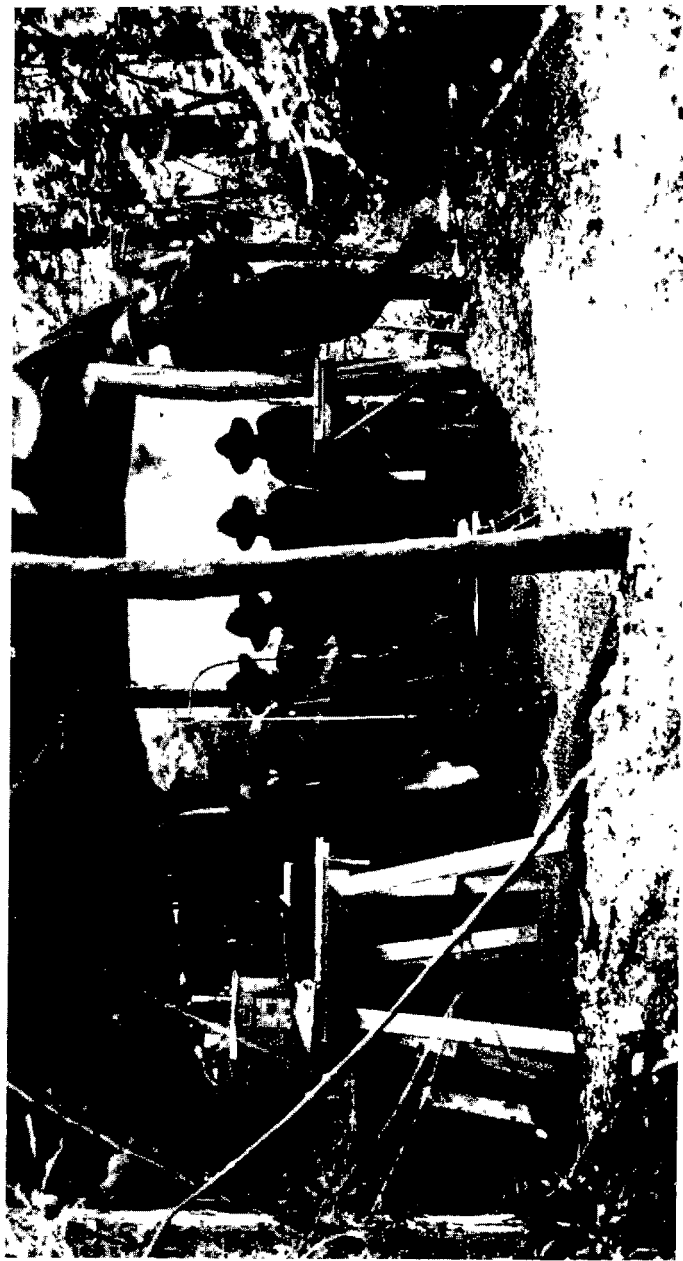
1916, 1917	..	..	..	..	..	1	dental unit per 7,000 men
1918	..	..	..	..	..	1	" " " 5,250 "
1918, 1919	..	..	..	..	..	1	" " " 4,250 "

Authority had been given for the attachment of a dental unit to each artillery brigade, but this was not done until 1918, men of the artillery in need of dental service being instead told to report to the nearest field ambulance. It was not, however, always easy or even possible for the men to do this and accordingly in 1917, the opinion of artillery commanders being taken, it was found that they were all of opinion "that the services of a dental unit were urgently required", and they undertook to find transport for the equipment.

Apparently, however, the D.D.M.S. of Corps took no action until the matter was again brought forward in March 1918, when it was approved. The proposal for an extra unit per division to attend to "divisional units" was not approved until after the Armistice.

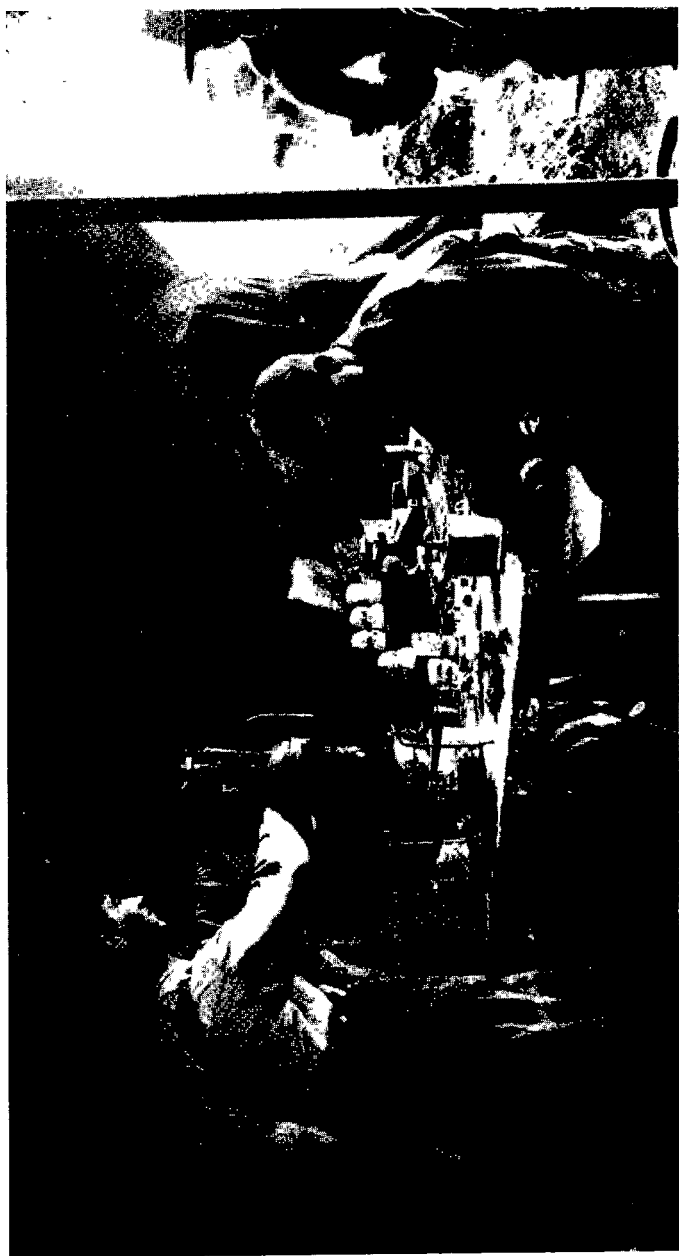
The experience and routine of Australian dental units in

²⁹ In the United Kingdom owing to the limited number of units available in 1916 dental units were constantly moving from one formation to another in order to cope with the arrears of work



15. SURGERY OF NO 34 AUSTRALIAN DENTAL SECTION, NEAR BUSSY, FRANCE, JUNE 1918

This section was attached to 5th Divisional Ammunition Column



16. THE MECHANICS' WORKSHOP, No 34 AUSTRALIAN DENTAL SECTION

Aust War Memorial Official Photo No E2374,

To face p 473

"Army" areas in France and Belgium are described in the following extracts from reports of the Dental Staff Officer for the A.I.F. in France (Major Day) and from the comments of Colonel Marshall:

Dental units are attached to all the field ambulances—15 in number—and to the casualty clearing stations.

Casualty clearing stations. The outfit supplied was a standard one, but more supplies could be retained as these stations were practically of a non-mobile variety. All classes of work were carried out, the patients being drawn from any unit that happened to be in the vicinity. Australians were naturally in the minority as an Australian casualty clearing station treated whatever troops came their way.

Ambulances The equipment provided was limited, owing to the difficulty of obtaining transport. No standard kit was carried until 1918, when equipment was cut down to 300 lb. This was sufficient for all practical purposes. When trench warfare was in existence the divisional ambulances with attached dental units were usually distributed as follows:

- (1) Advanced dressing station.
- (2) Main dressing station.
- (3) Divisional rest stations.

The dental officer at the advanced dressing station treated cases coming from an area between the ambulance and the front line and from units close to the A.D.S. No man was retained overnight at the A.D.S. for dental treatment, and should any man require urgent treatment whilst doing duty in the front line, he had to produce a dental report bearing the signature of his R.M.O. or a responsible officer. By this means no man could absent himself from the line on the plea that he left his post for dental reasons.

At the main dressing station as well as at the Divisional Rest Station, cases that required extensive dental treatment were admitted should the circumstances warrant it. Cases were seldom retained longer than four-tent days, the usual period being from seven to ten.

The initial system in vogue in France for obtaining dental stores was very unsatisfactory. Indents in triplicate were forwarded through the recognised channels (dental officer—C.O. Field Ambulances—A.D.M.S.) to Advanced Depot Medical Stores, from which perhaps certain articles could be supplied. Usually, however, the whole indent could only be filled by the Base Depot Medical Stores. Seeing that the War Office made no provision for the supply of dental stores, it usually came about that, upon receipt of an indent, a despatch would be forwarded to England for these stores. In some cases, months elapsed before these long overdue stores could be collected.

Dental stores were usually too bulky. The personnel of an advanced or Base Depot Medical Store had not the slightest knowledge of dental requirements.

The first reform was the standardisation of all dental equipment and supplies. S.O.A.D.S. France (Major Day) drew up a schedule of

what was considered a reasonable outfit, neither bulky nor weighty. The S.O.A.D.S. kept a reserve stock to meet any emergency or to cover breakage. (These supplies had been taken over from the Advanced Depot Medical Stores 4th Army, as this depot was moving to an area in which no British dental officers were employed.) Later a revision of dental equipment was carried out from the experience gained.

By keeping to this list no trouble was experienced with regard to later requisition, except for articles of equipment not in everyday use. In June 1917 Major Day wrote that now "I was able to have the requisitions for dental supplies for the month in advance, filled and delivered at the dental units within *nine days* from receiving the monthly requisitions. Previous to my being posted to 1st Anzac the time occupied in obtaining these same stores and supplies averaged *six weeks*. Dental units in II Anzac Corps and those attached to the 1st and 2nd A.C.C.S. have no difficulty in obtaining dental supplies as there is an Advanced Depot Medical Supplies at Bailleul in their area, and this store carries dental supplies. Thus the difficulty encountered by the units in 1st Anzac Corps in obtaining supplies does not exist for these units."

No change took place in the equipment list until March 1918, when the Australians were despatched from the northern sector to the Somme area to stop the German thrust to Amiens.

March 1918

Ambulances were ordered to cut down their transportable stores and equipment to a minimum. The question of transportation became very acute. Officers who had endeavoured to work with a minimum of equipment were gladly assisted by the O's.C. Ambulance. The only exception was found in the 3rd Division where the A.D.M.S. ruled that all dental equipment and personnel were to be transferred to No. 3 A.G.H. Abbeville. Had the dental equipment of the 3rd Divisional units been kept to a minimum, in all probability this would not have occurred. Though some dental stores belonging to dental units in the other divisions were also forwarded to No. 3 A.G.H., yet dental officers were able to undertake all urgent operations. The S.O.A.D.S. personally supervised the transport of these stores, which would have otherwise been dumped. As a state of mobile warfare was likely to be in operation from now onwards, a revision of the dental equipment became imperative. All surplus stores were ordered to be deposited temporarily at No. 3 A.G.H.

A new schedule was drawn up making provision for all classes of work with any equipment not exceeding 300 lb. Surplus stores at No. 3 A.G.H. were sent to the office of the S.O.A.D.S. who utilised them to supply units lacking any article on the revised list. The D.D.M.S. Australian Corps then directed O's.C. Ambulances and dental officers that transport would be provided for 300 lbs. weight of dental equipment.

On 30th March 1918 the staff of the S.O.A.D.S. France was increased by the addition of one staff-sergeant to supervise the requisitioning and supplying of dental stores. As a reserve stock of stores was held by S.O.A.D.S. the time occupied in completing the indents was usually very small, but officers were instructed to forward their indents at least three weeks before they expected to be in need of fresh supplies. No excuse in future was to be regarded as valid, if officers were held up owing to

[illegible]

which last figure represents the greatest number reached in that country.

Egypt In Egypt there were 17 dental units distributed as follows under the S.O.A.D.S. Egypt (Major Douglass).

Light Horse F. Ambs.	5
Base, Moascar	6
Desert Mounted Column	2
Headquarters, Cairo	1
14 A.G.H.	1
2 A.S.H.	1
No. 1 Sqdn. A.F.C.	1
Total	<u>17</u>

Here transport was always a difficult matter for the dental units in the field, owing to the great distances covered by the Light Horse, who naturally travelled with the minimum of impedimenta. Ambulance commanders gave the dental officers every assistance that lay in their power, but the limited means at their disposal frequently resulted in dental units being dumped until transport could be spared. All men sent into the field from the Base were as far as possible made dentally fit before being sent. Major Douglass writes:³⁰

Each man was charted and when he marched out of the training depot the chart was forwarded to the nearest dental officer who would arrange for the completion of the necessary treatment. This dental chart was returned to the Senior Dental Officer, Moascar.

Special dental treatment was available for all members of the A.I.F. at A.I.F. Headquarters and at No. 14 A.G.H., Abbassia. The class of work executed by many of the civil dental practitioners in Egypt was of the lowest quality yet substantial fees were always demanded from the troops; many complaints from members of the A.I.F. led to the creation of a "Dental Trust Account" by means of which extra equipment and material necessary for this special dental work could be purchased. Gold fillings and crown and bridge work were supplied to all ranks on payment of the actual cost of materials used;³¹ appointments could be arranged by telegram. The results fully justified the formation of these special dental clinics, the class of work being of the best and involving the minimum of cost to the soldier.

The general procedure adopted in Egypt for dental parades, etc., was parallel to that in existence in England. Provision was made for a thorough inspection of all troops passing through the Base at Moascar in order to eliminate all dental unfits from the drafts.

³⁰ His account is here epitomised.

³¹ Written consent of the S.O.A.D.S. had to be obtained before gold work was done.

Before the arrival of Major Douglass and the issue of routine orders the Australian Service here had suffered by the absence of a recognised administrator. The enthusiasm of all ranks had been considerably dampened by the lack of recognition afforded them for the seemingly never-to-be-completed task which they so conscientiously tackled. Through the tardy inauguration of the dental service so many dental unfits had accumulated that no matter how hard a dental unit might strive to clear up these arrears no appreciable difference was noted. Every proposition put forward by members of the dental service met with opposition through lack of knowledge. When Major Douglass reported for duty at Headquarters, Cairo he found that such opposition had not entirely disappeared though time and a closer liaison had effected great changes.

DENTAL POLICY AND TECHNIQUE

Of the general policy of the Service Colonel Marshall says :

"The object in view of all dental units was to render a man dentally fit as rapidly as possible, taking into consideration the value of conservative treatment. In the United Kingdom dental officers undertook all the conservative work, the taking of impressions, the fitting of dentures, and all the prophylactic measures adopted to combat the pathological conditions of the mouth. Overseas the dental officer—perforce—relegated the taking of impressions and the fitting of dentures mainly to the staff-sergeants; this had been brought about by the preponderance of operative work that was ever before the dental officer. Certain policies were laid down for the guidance of dental officers as follows:

"Conservation of teeth. No teeth should be extracted which can be saved.³² By close adherence to this policy many a tooth was saved which, if extracted, would have necessitated the fitting of a denture, and, as is well known, a soldier with dentures was far more likely to become a casualty than one depending upon his natural supply of teeth. Great attention was paid to oral hygiene³³ as the troops were very susceptible to ulcerative gingivitis. The order quoted above said: 'Efforts will be concentrated upon cleansing the mouth and preserving useful teeth.

"In the United Kingdom and at the Bases in France and Egypt men were called up for dental treatment by the dental officers; in the field dental parades were purely voluntary. The first operations to be attempted were the cleansing of the mouth and the completion of whatever extractions were necessary. If a denture was indicated, and the condition of the man's mouth such that no delay was necessary, the dentures were undertaken without any waste of time. Fillings

³² A A M C Order No 103 of 4 Apr. 1917

³³ For example, between Apr 1918 and the troops' return to Australia, 1,336 dozen tubes of tooth paste were issued free from the Australian Base Depot of Medical Stores alone.

took up most of the dental officers' time however; owing to the high standard of efficiency in existence, practically every cavity had to be filled."

Every dental unit whether at a Base or in the field, gave first consideration to troops in need of immediate relief, all other necessary operations being undertaken in order of urgency. It was the usual practice to devote the first part of the day's routine to extractions. In certain Command Depots in the United Kingdom and at the Base in France it was the practice to group the work, one officer supervising all the prosthetic work, another the extractions, whilst the remainder would concentrate upon fillings.

In the field, should the circumstances demand it, cases were admitted to a field ambulance after having extensive extractions done, in order that light diet could be supplied.

As to technique, Colonel Marshall states:

Mechanical work. With the exception of the units attached to A.I.F. Headquarters at London and Cairo, Queen's Hospital, Sidcup, and Australian Corps Headquarters, France, mechanical work was limited to the construction and repair of vulcanite dentures. The addition of the apparatus necessary for metal work would have made dental equipment elsewhere too heavy for transport.

Dentures were supplied if a soldier had not sufficient teeth to masticate the army ration. Very rarely were dentures provided for a restoration of less than four teeth, the majority of dentures making good a deficiency of five or more teeth. With the introduction of the small box respirator (S.B.R.) it was found that the loss of perhaps two or three incisors prevented the soldier from gripping the mouth-piece in the approved fashion. In all cases where men stated that this difficulty had been experienced a denture was provided.

Most dentures supplied were partial uppers. It was found that in many cases the soldier would wear the upper denture but carry the lower in his pocket. Accordingly, where the dental officer considered that a lower denture would ultimately be discarded by the soldier, an upper denture would be inserted and if the patient expressed satisfaction and was prepared to carry on without a lower plate he was considered as dentally fit.

Impressions were usually taken with modelling compound.

Teeth. Both diatoric and pin teeth were used; platinum pin teeth were at first supplied but later, owing to the scarcity of that metal, composition metal pin teeth were substituted giving entire satisfaction.

Rubber. Three varieties were supplied—brown, gum pink, and repairing.

Crown and bridge work were carried out at A.I.F. Headquarters, Horseferry Road, but no fresh bridge work was attempted, repairs only being undertaken. Crowns were supplied where the extraction of the tooth would result in hardship for the soldier concerned. The cost of gold used was defrayed by entry in pay book and acquittance roll. The S.O.A.D.S. France carried the apparatus for such work and any officer desiring to carry out urgent gold work could use it. In Egypt all

varieties of conservative and prosthetic work were done at A.I.F. Headquarters, Cairo.

In the field synthetic cement was used as a substitute for a broken facing until the patient could gain proper attention. Cases were noted in which the cement still held even after a period of nine months. A limited number of Davis crowns were obtainable in the field.

Fillings. In the field and the depots in England and Egypt amalgam and cement fillings were inserted. Dental officers were instructed to employ amalgam wherever time and circumstances permitted; in the field, where less root treatment could be given, oxyphosphate of copper cement was particularly valuable in extensive excavation, the cement acting as an efficient obtundent as well as an excellent medium to arrest further caries. Synthetic cement was seldom used, most cavities in the incisors being filled with either white copper cement or amalgam. Copper amalgam was employed extensively in cavities involving the gingival margin and in extensive caries of all molars. Many dental officers employed a lining of copper cement underneath the amalgam, such a combination giving excellent result.

Root treatment. A great number of root treatments were carried out as every endeavour was made to conserve every useful tooth. The drug employed in all cases of decomposition of the nerve was Trikresol and Formalin which rendered excellent results. Root fillings in these cases were usually made up of oxpara and gutta-percha points.

Colonel Marshall points out that as the number of dental units was increased the numbers of dentally unfit were gradually reduced. However, the sequel to any active fighting in France was an almost immediate increase of dental unfits in the Command Depots, due to the discharge from hospital of men who had been sent from France dentally unfit. Even with this handicap the number of extractions steadily diminished and fillings proportionately increased. The returns show an increase of 63 per cent. in fillings with a corresponding decrease of 45 per cent. in extractions.

At Queen's Hospital, Sidcup, where plastic work was undertaken on members of the A.I.F. in need of this, a dental unit under Major Kenneth Russell was attached, as all wounds of the jaw required dental, in addition to medical, attention.

The dental unit was concerned in the construction of splints of all descriptions; owing to the variety of conditions existent, each case was carefully studied and a special appliance made to meet its requirements.

The apparatus evolved was the result of suggestions from

medical and dental officers and the staff-sergeant mechanics, considerable technical skill and ingenuity being required in the construction of the mechanical appliances for all jaw cases.

The pathological condition of the gums known as "Vincent's Disease", "ulcerative stomatitis", or "trench mouth", though noticed in the A.I.F. at No. 1 General Hospital, Heliopolis, did not obtain an alarming hold until in 1917 troops wounded in France started drifting into the training areas from various Command Depots and hospitals. At that time so great were the numbers of troops infected that liquor arsenicalis was ordered by the gallon and dental officers were especially detailed to treat this disease alone. Though it was probably less prevalent among Australian than among British troops it would be safe to say that at no time in 1917 were there less than 500 Australians invalided from training duties and isolated from contact with other troops because of attack by this rather repulsive dental disease. Between 1st September and 1st December 1917, there were 3,532 cases among Australian troops.

Careful prophylaxis by cleaning of mess utensils, etc., and, in every case, scaling were urged. A circular described the disease as follows:

Ulcerative gingivitis is a form of oral infection which of late has attracted considerable attention. It is an aggressive ulceration of the gums and neighbouring tissues. The lesion starts with a cushion-like red swelling on the gums near a tooth. As the gum swells it separates from the tooth and later becomes discoloured with a yellowish purulent exudate within the superficial layers of the mucous membrane. Beneath this exudate the tissues become necrotic, and in a short time the infiltrated area has been replaced by an ulcer. As the ulcer extends the tooth may become loose in its socket and lost. A yellowish-brown or dirty-grey exudate adheres to the floor of the ulcer, and if detached there is free haemorrhage. The palate is not often involved, but it may extend to the tonsils.

The disease is caused by infection with a mixture of spirochaetes, bacillus fusiformis, and pyogenic cocci, and is identical, as regards causation, with the old hospital gangrene. It is probable that the spirochaete like many other organisms only becomes pathogenic under certain favourable conditions. "Vincent's angina" and "ulcerative gingivitis" are identical in their aetiology. It can be transmitted by the use of drinking utensils, etc.

In consultation with Colonel C. J. Martin a dentifrice, in the form of a small cake of soap containing liquor arsenicalis,

was issued from the Australian Base Depot of Medical Stores to dental officers for distribution to men who were apparently cured of the disease. This proved a material assistance in preventing recurrence.

The following are statistics of the operations performed by the Australian Army Dental Service in England, on the Western Front, and in Egypt between August 1915 and 30th June 1919.

Statistics

	1915-1916	1917.	1918	1919 to 30 June.	Grand Totals.
<i>Cases treated.</i>					
U.K. Depots ..	82,363*	254,002	351,607	50,505	1,211,457
U.K. Hospitals ..	—	15,940	24,332	11,048	
France	—	157,538	153,258	36,260	
Egypt	—	30,789	33,681	10,134	
<i>Teeth extracted.</i>					
U.K. Depots ..	40,804*	95,184	31,453	3,026	312,307
U.K. Hospitals ..	—	4,136	3,220	733	
France	—	57,880	44,820	9,436	
Egypt	—	10,354	9,445	1,816	
<i>Local anaesthetic.</i>					
U.K. Depots ..	No record.	46,560	17,785	2,466	154,726
U.K. Hospitals ..		1,581	1,865	487	
France		36,004	27,105	6,201	
Egypt		7,191	6,278	1,203	
<i>General anaesthetic.</i>					
U.K. Depots ..	No record.	86	9	—	764
U.K. Hospitals ..		33	99	11	
France		257	199	25	
Egypt		8	34	3	
<i>Amalgam fillings.</i>					
U.K. Depots ..	18,737*	68,718	135,154	4,550	323,771
U.K. Hospitals ..	—	2,316	5,160	1,769	
France	—	22,163	29,632	6,322	
Egypt	—	8,159	17,049	4,042	
<i>Cement fillings.</i>					
U.K. Depots ..	8,843*	34,912	34,835	3,047	132,600
U.K. Hospitals ..	—	1,153	2,337	1,307	
France	—	17,110	18,098	4,130	
Egypt	—	1,442	3,768	1,618	

	1915-1916	1917.	1918.	1919 to 30 June.	Grand Totals.
<i>Root fillings.</i>					
U.K. Depots ..	3,681*	10,723	13,042	1,612	56,033
U.K. Hospitals ..	—	500	1,168	558	
France	—	7,116	8,500	1,814	
Egypt	—	1,733	4,357	1,229	
<i>Temporary fillings.</i>					
U.K. Depots ..	—	9,284	12,255	2,828	55,886
U.K. Hospitals ..	—	1,197	1,540	1,077	
France	—	8,941	8,155	1,859	
Egypt	—	1,262	4,865	2,650	
<i>Scaling cases.</i>					
U.K. Depots ..	—	10,793	26,178	2,897	60,696
U.K. Hospitals ..	—	785	2,008	838	
France	—	4,162	8,004	2,388	
Egypt	—	769	1,374	500	
<i>Dressings.</i>					
U.K. Depots ..	10,170*	22,199	27,203	4,268	131,284
U.K. Hospitals ..	—	1,621	2,478	1,834	
France	—	16,323	23,403	4,262	
Egypt	—	4,328	9,705	3,490	
<i>Minor operations.</i>					
U.K. Depots ..	19,058*	49,612	48,905	5,747	189,503
U.K. Hospitals ..	—	1,954	4,591	1,552	
France	—	24,225	17,964	4,169	
Egypt	—	4,892	4,274	2,560	
<i>Ulcerative gingivitis.</i>					
U.K. Depots ..	—	21,603	52,526	19,523	134,419
U.K. Hospitals ..	—	618	2,556	2,220	
France	—	8,826	15,792	5,743	
Egypt	—	1,907	1,711	1,394	
<i>Pyorrhoea.</i>					
U.K. Depots ..	—	4,418	11,396	949	21,409
U.K. Hospitals ..	—	438	295	75	
France	—	1,548	1,117	95	
Egypt	—	244	613	221	
<i>Crowns.</i>					
U.K. Depots ..	500*	550	473	34	3,191
U.K. Hospitals ..	—	64	141	78	
France	—	695	365	64	
Egypt	—	42	104	81	

	1915-1916	1917	1918	1919 to 30 June	Grand Totals
<i>Fractured jaw cases.</i>					
U.K. Depots ..	—	26	128	—	849
U.K. Hospitals ..	—	77	338	41	
France	—	94	92	7	
Egypt	—	4	38	4	
<i>Dentures:</i>					
<i>Full upper.</i>	929*				
U.K. Depots ..	—	2,924	2,264	364	11,802
U.K. Hospitals ..	—	213	314	122	
France	—	1,647	1,878	362	
Egypt	—	298	386	101	
<i>Full lower.</i>					
U.K. Depots ..	226*	853	531	96	3,189
U.K. Hospitals ..	—	65	95	39	
France	—	728	299	70	
Egypt	—	82	81	24	
<i>Partial upper.</i>					
U.K. Depots ..	3,781*	21,846	17,001	1,841	74,183
U.K. Hospitals ..	—	1,257	1,375	513	
France	—	10,566	9,524	2,109	
Egypt	—	1,600	2,119	651	
<i>Partial lower.</i>					
U.K. Depots ..	2,219*	19,688	16,857	976	57,863
U.K. Hospitals ..	—	829	985	259	
France	—	7,016	5,549	948	
Egypt	—	978	1,304	255	
<i>Repairs.</i>					
U.K. Depots ..	4,315*	11,220	11,633	3,811	76,971
U.K. Hospitals ..	—	763	1,319	725	
France	—	14,504	16,746	4,534	
Egypt	—	1,774	3,932	1,695	

* These figures are incomplete owing to a number of units not keeping records during the period 1915-16.

STATISTICS (FROM RECORDS AVAILABLE) OF TROOPS TREATED BY THE AUSTRALIAN ARMY
DENTAL SERVICES IN FRANCE AND LEMNOS.

	Australian Troops.	British Troops	New Zealand Troops	French and Belgian Troops.	Canadian Troops.	American Troops.	South African Troops	Chinese, Portuguese and Indian	French and Belgian Civilians	Prisoners of War.	Other than A.I.F. or B.E.F.
3rd A G H., Lemnos, Aug. to Dec. 1915	4,040	1,691	552								
1916	(No records).										
France, 1917	142,443	13,300	97	211	177	—	4	22	617	90	577
" 1918	131,595	18,593	67	597	132	115	18	32	1,750	85	129
	278,078	33,584	716	808	309	115	22	54	2,367	175	706

CHAPTER X

THE AUSTRALIAN ARMY PHARMACEUTICAL SERVICE: MEDICAL EQUIPMENT AND STORES

THE military service with which this chapter is concerned—the supply and distribution of medical “equipment and stores”, and the place in the organisation of the medical service of the trained personnel charged with those duties—differs fundamentally from the others included in this section. The difference lies in this, that the “service rendered”, though it was both highly skilled and of great importance, was wholly material and accessory. It did not, as did the others, involve or include any direct participation in the actual performance of remedial or prophylactic actions.

The occupation or profession of the Apothecary, Pharmacist, or Pharmaceutical Chemist has a history that is as old, honourable and chequered as that of medicine itself.¹

The historic background

It is indeed part and parcel with medicine and it has shared with medicine its visions, its strivings, and its shames. The science of medicine has created a science for the apothecary, and a place as clearly defined and honourable in its subsidiary sphere as that of medicine itself.

Pharmacy, like medicine, had a twofold origin, in folklore and in magic. Like medicine it began in empiric folklore; and it shared in its “magic”. And, as with medicine, not even yet has “science” made it wholly independent of either of these! The occupation of pharmacy is based on the fact that certain natural substances—animal, vegetable, mineral—have an influ-

¹ The writer has to acknowledge great help received from the admirable work, *Four Thousand Years of Pharmacy—An outline history of Pharmacy and the Allied Sciences*, by Charles H. La Wall (Philadelphia and London: J. B. Lippincott Company). The details of the medical side of the picture are derived largely from *An Introduction to the History of Medicine* by Fielding H. Garrison, Fourth Edition (Philadelphia and London: W. B. Saunders Company, 1929.) Much information was also received from the veteran Australian pharmacist, the late Mr. Fred Wright. *The Professions* (Carr-Saunders) is a most useful social guide.

ence on the physiological processes of the human body. The nature of this influence lies deep in the mystery of life itself, and to most of mankind this mystery has been, and to some extent still is "magical".

In the earliest times the priest-physician was his own apothecary. The most important early writings are Pharmacopoeias, and were almost as polypharmical and pseudo-scientific as, until this past century, were our own. But they recorded some sound and useful discoveries—otherwise they could not have survived. Pharmacy of the Greek age was in a measure based on exact observation—but a man must make a living! In Rome physicians and pharmacists at first were slaves and lived by their wits as much as by their wisdom; as to-day, the best were honest and scientific, the worst were sheer exploiters of mystery and credulity. The great majority (it would seem) did their best to guide themselves and their brother men in the darkness through which they peered only less blindly than he.

Galen was the last scientific physician pharmacist of the classic period. There followed the age of the search for a sign—for the *ignus fatuus* of the "universal panacea". The torch of scientific pharmacy as of scientific medicine was for two centuries kept alight by Arabian culture, from which the science of "chemistry"—and the pseudo-science of alchemy—derive. It is recorded that the Arabian apothecary shops were regularly inspected. "The effect of Arabian chemistry and pharmacy upon European medicine lasted long after the Mohammedan power itself had waned."²

The separation of pharmacists from physicians dates from about the 13th century—the dawning of the revival of learning and the withdrawal of the Church from medicine. By the 15th century, when the mediaeval period ended in the Renaissance, pharmacy had attained the dignity of a distinct calling, subservient to medicine, but separate. Paracelsus, the first pharmaceutical chemist, passes meteor-like across the early years of the 16th century. To the early 16th century belongs also the separation of the physicians from the surgeons and from the apothecaries. And the curious instinct which makes a fetish of mystery placed the physician on a plane from which he looked down on both.

² Garrison, *loc. cit.*, p. 137.

The vendors and compounders of drugs were linked with the grocers; those who were concerned in the mechanical processes of surgery with barbers and butchers. Each group at last fought its way clear to a scientific status. To the pharmacists King James I—advised perhaps by Bacon—granted a separate guild. “Grocers,” he said, “are but merchants; the business of the apothecary is a mystery; wherefore I think it fitting that they should be a corporation of themselves.”³

But the price, as ever, was vigilance, for now they had the physicians against them. “The reason for this” (says Garrison) “was that the apothecaries themselves set up as practitioners, not only selling drugs but prescribing them.”

A crucial trial of strength took place in 1703 when the British Royal College of Physicians took action at law to restrain the apothecaries from prescribing. The trial, which went to the Privy Council, resulted in favour of the apothecaries. From that time to the present day there have been in Britain two branches of internal medicine—that which derives from the union, after 2,000 years of conflict, of the physician and the surgeon; and that which derives from the first specialty of medicine, the apothecary and pharmacist.

The last stage of this centuries-old battle is perhaps the most interesting. Briefly it was the social contest between conservatism, entrenched in orthodox medicine, and the scientific free-thought of the democratic and plebeian apothecaries. It resulted in the creation of the General Practitioner, with the comprehensive degree—medicine, surgery, and obstetrics—initiated by the Society of Apothecaries.⁴

In the meantime, however, within the Society of Apothecaries itself the same issue had arisen—between the making and the using of drugs. In Great Britain the Poisons Act (1868) which laid down that no person should sell *poisons* without a

³ The significance of this notable statement lies in the meaning of the word “mystery”, which in the 17th century was widely used in this sense of pertaining to an “art, craft or profession” as opposed to merchandising. Thus “The Art and Mystery of Pharmacy” might more properly be translated “The Art and Profession of Pharmacy”.

⁴ It was, indeed, almost half a century in advance of the “Royal” Colleges. For an account of the reform see Prof. Carr-Saunders’ *The Professions*.

licence, developed into the *Pharmacy Acts*, whereby the dispensing of "drugs" was prohibited save to persons who had pursued a prescribed course of study and passed the required examination conducted by an authorised body—selected within the occupation itself. Thus arose our present-day *Pharmaceutical Chemist*.

The final phase of the evolution of pharmacy lies in the development of the science of synthetic "chemistry", and of "bio-chemistry" and belongs to the 20th century. And here (it may be proposed) lies also the future of pharmacy as a science and a profession.

In Australia. The earliest history of pharmacy in Australia followed closely the course of events in Great Britain. Registration of pharmacists became compulsory in New South Wales and Victoria in 1876, in Queensland in 1884, in South Australia in 1891 and in Western Australia in 1894. The Tasmanian Pharmacy Act was passed in 1908, and prior to that date pharmacists were registered by the Court of Medical Examiners under *Act 6 Victoria No. 2*. At the outbreak of war,⁵ the local situation was—

In all the States a pharmacist had to undergo a compulsory system of education and examination before his name could be placed on the Pharmaceutical Register. This system embraced

1. A stringent entrance examination;
2. Apprenticeship ranging from three to four years;
3. Attendance at compulsory lectures at either a University or College of Pharmacy;
4. Passing the prescribed theoretical and practical examinations;
5. Attaining the age of twenty-one years.

Although in minor details the curriculum in the various States differs slightly, substantially the system is uniform throughout Australia and New Zealand. There is complete reciprocity between all the States. The various State diplomas are also recognised in Great Britain and New Zealand and by the Federal authorities at the Seat of Government.

In Australia as in Great Britain the outbreak of war found the pharmacists a highly organised body of men fully competent and trained in their specialty. Professional associations and journal helped to maintain the "honour" as well as the "interests" of members. On the side of "trade", both wholesale and

⁵ This information was kindly furnished by Mr. C. L. Butchers, Secretary of the Pharmaceutical Society of Victoria.

retail, activities were thoroughly organised, and a promising field for local manufacture was being explored and exploited.

In the Army as in civil life, unlike dentists, masseurs and nurses, pharmacists do not take a direct part with the medical

**Place of
pharmacy
in Army**

personnel in the treatment of wounds or disease. This fact—the result of four thousand years of cultural evolution and pharmaceutical history—strongly colours the whole history of the service, the general effect being that the material element in the service is much more important than the technical responsibilities and duties involved. So much is this the case that the members of the professional group concerned with the corresponding service in civil life are often found relegated to a subordinate and narrowly technical position in the conduct and execution of this military-medical function. Thus an accountant, who had been given commissioned rank as a “quartermaster” for the purpose, was placed in command of the Australian overseas Base Depot of Medical Stores, and supervised the work of the pharmacists employed there; and the Quartermaster of a General Hospital claimed supervision over the Pharmaceutical Department. Whatever may happen in civil life, in the A.I.F. the pharmaceutical service was allowed little more than the duty of “compounding” and “dispensing” the various galenicals employed as “medicines”; and though, in the war, medicine was only in the earliest stage of the revolution which in the past half century has transformed “therapeutics” from an empiric art to a rational science, and the “drug habit” was still rampant even in the medical profession, even the duty of dispensing became largely unnecessary through the extensive use in the British Army of “medicines” in “tablet” form and of stock solutions.

This chapter, therefore, is concerned with procedure and results, rather than with the technical details of the professional work involved; indeed the details of “compounding” and dispensing do not come within its scope. Instead, it is almost wholly concerned with the general nature of the medical supplies, and the organisation and method of assembling them at the right time and place.

Moreover, the field of medical supplies during the war

extended outside the scope of the pharmaceutical chemist altogether and into that of his hereditary enemy, the "grocer"—here represented by the Army Supply Corps and Army Ordnance Corps—from which derives the military group given honorary commissions and designated "quartermasters"—a title dragged in by the Army to circumvent the necessity of granting "substantive" commissions to other than certain socially acceptable classes of personnel. This side of the problem is examined in the second part of the chapter.

The subject therefore divides itself naturally in two heads—first, the supply of medical, surgical and dental equipment; second, the work of the A.A.M.S. personnel, especially the enlisted members of the pharmaceutical profession, in the duty of obtaining, storing, and distributing such stores, and compounding of drugs and galenicals. During the war these trained men became associated as a special "Service"—The Australian Pharmaceutical Service; and it will be necessary to examine the place of this body of specialists in the Army Medical Service and the Army.

Though related to each other these two aspects of the subject were, as in peace, distinct and in some respects even largely independent. The supply of medical and dental equipment and stores in the Army involved services far beyond the normal scope of the pharmaceutical profession. The place therefore of the trained pharmacist within the Army Medical Service, and, as arising inevitably therefrom, the status of a pharmaceutical service, can be better studied after examining the problem of medical supplies.

Neither the system of medical supply in the Australian Army, nor the creation of the Pharmaceutical Service was controlled by clear purpose or policy, and this was an outstanding cause of confusion. As concerns the supply of medical stores, confusion was created at the outset by uncertainty regarding the responsibility of Australia for providing them to her troops and medical units overseas. The history of medical supply in the Australian Army carries on in a direct line the British military traditions and procedure that "grewed"—"evolved" would connote a wholly unwarranted sense of orderly development—

**Initial handicaps
—lack of policy**

**The evolution of
medical supply
in war**

during the two and a half centuries following the creation in 1660 of the Standing Army.

The supply of "medical equipment and stores" in the medical services of armies in the field can scarcely be said to date earlier than the creation of an organised medical service. Since the wars of Julius Caesar (if we except the extraordinary episode of the mobile hospital system designed by Queen Isabella of Spain in 1487, and the activities of such voluntary agencies as the Knights of St. John) any exact record of an organised military system for supplying medical stores is lacking till the Napoleonic Wars of the 18th-19th centuries. In the British Regular Army in the 17th and 18th centuries the medical officers of regiments provided both stores and transport out of their own pay and special allowances. For the improvised mobile hospitals of the European wars of William of Orange and Marlborough, reliance seems to have been placed chiefly on local purchase.

Both Wellington and Napoleon, through their celebrated medical directors—McGrigor, Larrey, Percy, Desgenettes—ensured that the sick and wounded were dealt with systematically, even if the "system" was crude when judged by modern ideals. In Wellington's Peninsular army medical stores, in common with most military supplies other than ordnance, were obtained through army contractors, and in the British Army this system of medical supply was still in vogue in the War of 1914-18. The history of medical supply in the Crimean Campaign is too well known to call for comment—save perhaps to observe that the blame does not by any means rest solely on the medical service. That service will never be disappointed if it expects the worst of both worlds—in peace, national neglect, in war, national abuse.⁶

It would seem that only through the sufferings and horrors of ill-organised and maladministered wars will British peoples grudgingly consent to prepare and pay, in peace, for an efficient medical service for war. The organisation of the *Army Service Corps* and *Army Medical Corps* after the Crimea in the second

⁶ cf. Vol. I, p. 447, the Dardanelles Campaign and Commission; Vol. II, p. 287, B.E.F., 1914; also Sir Andrew Smith—*Medical History of British Army in Turkey and Crimea, 1854-56* Kinglake (*Crimea*, Vol. VII), is highly illuminating.

half of the 19th century⁷ marks the beginning of the modern medical service as a self-sufficient and effectively equipped military department. The allotment of responsibility for medical equipment partly to *Medical Stores Depots*, partly to the *Army "Supply" Service* (Army Service Corps—A.S.C.), and partly to the *Army Ordnance Service* (Army Ordnance Corps—A.O.C.) brought the Army Medical Service in the matter of supplies within the structure of the Army as a whole. British Indian Frontier and Egyptian Wars of the 'eighties and 'nineties, in particular the South African War, were a "try-out" for the new organisation. In the South African War the problem of supply in the field—including the medical part of it—would probably have been very successfully met had the average British Army officer of the day been willing to bring himself down to a serious study of this—or of any other—branch of scientific warfare.⁸

In the South African War "Red Cross" supplies first became an accepted supplement to military sources.

The Esher Commission and the Haldane reforms put the coping stone to the reforms and brought Sir John Cowans as Quartermaster-General, Sir Alfred Keogh as Director-General of Medical Services—two of the greatest organisers and administrators the British Army has known—indeed the history of these men and of their work is part and parcel with that of the A.I.F.

It is not necessary to examine the service of medical supply in the several Australian Colonies before their federation in 1901. The following extracts from a paper written in 1923 by Major G. E. Sykes⁹ helps to record the developments after Fed-

⁷ The former has been admirably told by Sir John Fortescue in the *History of the Army Service Corps*. The history of the Army Medical Corps is still, save for a small brochure and sundry articles, unwritten.

⁸ The attitude of British Army officers toward such menial duties as supply and equipment is illustrated by the statement by Sir John Fortescue, which illuminates the whole attitude toward problems of supply in the British Army at this time:

"It is very clear, from Lord Roberts' evidence before the Royal Esher Commission, that he had not the slightest idea what the existing transport organisation was. He seems to have thought that there was nothing but regimental transport, and it was necessary to remind him of the existence of supply columns and supply parks. Lord Kitchener's ignorance appears to have been at least as profound, though it manifested itself in a different fashion. When Col. Bridge spoke to him about ammunition parks and supply parks Lord Kitchener simply stared at him blankly and ejaculated, 'I don't know what you mean'." (From *The Royal Army Service Corps*, by John Fortescue, Vol. I, pp. 236-7)

⁹ Of the Australian Instructional Corps. The paper was prepared for the first Commonwealth A.A.M.C. course

eration and to elucidate the problems that rose in the War of 1914-18.

In order to deal fully with the question of the supply, storage and accountancy of equipment for the Australian Army Medical Services, it is necessary to go back to the early period of Federation. Before doing so, however, it will be well to note certain general points important to bear in mind. The first is that the equipment of the Australian Army Medical Service is based on "scales of equipment" as adopted for the Imperial Army Medical Service. In the second place, it is convenient to note that equipment is naturally divided into that required for peace (which under present organisation, is limited to instructional stores for regimental medical establishments, ambulances and sanitary sections), and that required in time of war.

With regard to the latter, though the defence organisation of Australia has not yet been called upon to supply equipment for a war within our own country, still, owing to the necessity of providing the equipment for the first medical units of the A.I.F., and for transports, and for the requirements of the large number of returned invalids in the Great War, some experience was gained in regard to war requirements.

War requirements may again be sub-divided into the equipment required for—

- (a) Army Medical Corps personnel (comprising clothing and personal equipment).
- (b) that for use by the Army Medical Corps personnel in looking after sick and wounded under their care.

The latter consists of ordnance stores, such as stretchers, beds, bedding, tents, hospital furniture (other than operating) and other articles shown in the "Priced Vocabulary of Stores", some of which are common to other arms of the service; and special medical equipment and stores comprising (a) stores perishable with or without care, such as rubber goods which perish with time irrespective of the care bestowed; (b) stores perishable without technical care such as surgical instruments; and (c) stores not manufactured in Australia, such as surgical dressings, quinine, morphia, etc., the latter being a very important matter in event of war in Australia.

Bearing these points in mind we return to the early period of Federation.

At Victoria Barracks, Sydney, and at Queenscliff, Port Phillip Heads, there had been established under State organisation two small "Garrison Hospitals", chiefly for the purpose of caring for sick members of the Permanent Artillery. These were taken over at Federation by the Commonwealth Defence Department, but neither at that time, nor subsequently, was their equipping a matter of more than minor concern.

The first Federal action of any importance in regard to medical equipment was in connection with the ill-fated *Drayton Grange*¹⁰ on its return with troops from the South African War in 1902. At short notice a small hospital had to be established at Portsea—this hospital

¹⁰ A transport in which troops were hurriedly embarked without proper preparation—an object lesson of methods ever since carefully avoided.

was fully equipped ready to receive patients on arrival of the transport in Port Phillip Bay.

From this period onward up to August, 1914, small amounts were placed on defence estimates firstly to meet peace requirements for training, and, secondly, for the building up of a supply of equipment in Base Depots for use in event of mobilisation in Australia. In conjunction therewith Base Depots were established in each Military District, under the District "Principal Medical Officer". The largest vote was of £11,000 for financial year 1912-1913. The provision made that year was most fortunate since it allowed of sufficient equipment being available in 1914 to fit out the Naval and Military Expeditionary Force despatched to German New Guinea, and also the 1st Division of the Australian Imperial Force.

In the First World War the history of "medical supplies" in the A.A.M.S. belongs to three spheres of action: 1. Australia

Equipment of A.I.F. (a) the equipping of medical units and regimental establishments for the A.I.F., and outward-bound troop transports; (b) providing for the requirements of camps of training and hospitals in Australia.¹¹ 2. Sea transport—the outward and homeward voyages. 3. The Australian Imperial Force (a) at the Overseas Base—Egypt or England; (b) in the field.

Australia. As to the equipment of overseas units and establishments, Major Sykes says:

Special tables showing articles of equipment to be taken abroad were issued for F. Ambs. and L.H. F. Ambs, based chiefly on the British Equipment Standing Orders for Expeditionary Force; and though the A.M.S. vote of £11,000 for 1913 had permitted some substantial increase in the reserve of medical equipment and stores in each State, the amount held at the beginning of the war additional to the requirements for peace training was inadequate for more than equipping the existing Commonwealth Military Forces on a war footing; and even for that much old and almost useless equipment would have had to be used. Complete mobilisation of the C.M.F. not having been carried out, this equipment was available for the A.I.F., in both the raising and equipping of which the mobilisation machinery was almost automatically used.

The reserve was, however, barely sufficient for the requirements of the A.I.F. Most of the old was therefore retained, and A.I.F. units were issued with new or with newly filled panniers, obtained (together with first field dressings the supply of which was also inadequate) through special tender and contract. Little of the material was manufactured in Australia. The assembling of the special wicker panniers of F. Ambs. was not completed by the time the force sailed, and it was

¹¹ Responsibility for equipping the A.N. & M. Expedition appears to have been left to the P.M.O. in New South Wales and to have been done entirely from Sydney. It has been stated to have been haphazard and inadequate.

only shortly before the 3rd Brigade was detached in Egypt for Gallipoli that their field equipment was completed.

The "first field dressings" manufactured in Australia were at first found so inferior as to be useless in the field and were in Egypt replaced from England. Of stretchers there were carried 46 per F. Amb., 4 per wagon, and 1 per stretcher squad of six men. No provision was made for a reserve of stretchers or blankets—a defect in the early arrangements which was felt seriously in the first fighting.

At the end of 1914, two General Hospitals, two Stationary Hospitals and one Casualty Clearing Station, fully equipped, left Australia by Hospital Ship *Kyarra*, and as no preparatory measures had been taken in peace-time for equipping

Equipment of first hospitals medical units required at the Base or on lines of communication, urgent action was necessary by the Quartermaster-General's Branch for the supply of ordnance stores, and by the Medical Services for the supply of medical and surgical equipment for these units.

Physicians, surgeons, radiologists and bacteriologists were hurriedly got together to prepare lists of medical and surgical requirements. These lists were tabulated and orders placed on firms able to supply. The departmental principle of obtaining three quotations was complied with, but there was so little difference in the quotations that the policy was adopted of dividing equipment into three lots, each firm being called on to supply practically a share equal in value to the others.

Later, other field medical units were despatched but supplies were obtained on a different system, viz: by demands on the Contract and

The Contract Board Supply Board, ordnance stores being demanded by "Q" Branch, and medical and surgical stores by D.G.M.S. Special forms were printed for "Contract Demands", which allowed space for giving a description of the articles, the number and quality required, and estimated cost. As soon as stores demanded by the D.G.M.S. were obtained, a medical officer was detailed as member of a Board to inspect them, and if passed, action was taken by the Contract and Supply Board to deliver in accordance with demand.

This system was a great relief to the Army Medical Services as it eliminated the difficult question of accountancy which subsequently, so far as the A.A.M.C. was concerned was not needed.

This completed the supply of equipment for A.I.F. medical units so far as Australia was concerned.

Nothing made the term "Expeditionary Force" less applicable to the A.I.F. than the matter of equipment and stores. No depots of medical stores were raised, these being line of communication units. Instead a haphazard and extraordinarily assorted congeries of drugs, dressings and instruments was placed on the transports or obtained individually by units through the Red Cross. The absence of precise policy for the replenishment of medical stores and equipment was a difficulty most seriously felt in the first year of the war.

In the matter of needs for *medical supplies in Australia*, it may be said at once, that the lessons of the First World War have largely been learnt and followed in Australia in the present war. Procedure was simplified, the organisation of the Military Districts made more exact, and, most important, the necessity for providing from the outset against vicissitudes of supply was realized. "Hoarding", and "profiteering" were taken in hand early. It is the duty of this history briefly to outline the developments in Australia that brought this about.

**Medical supplies
for home needs**

Major Sykes sums up the experience as follows:

After completion of equipment of the original A.I.F., events may be summed up as one rapid expansion of District Base Depots of Medical Stores, particularly in the 2nd and 3rd Military Districts; for part of the war the depot in the 3rd Military District (Victoria) was used as a Central Base Depot of Medical Stores under control of Army Headquarters.

One of the most important duties of these depots was the supply of equipment for military hospitals established throughout Australia for the reception and treatment of invalids returning from active service. This was in addition to the continued supply to transports proceeding abroad with troops and reception from transports returning to Australia with invalids, and two hospital ships.¹²

The items which passed through Base Depots of Medical Stores consisted of large quantities of drugs, medical materials and appliances, surgical instruments and dressings, rubber goods, dental supplies, bacteriological, pathological, X-ray and orthopaedic outfits, the two latter containing quantities of electrical fittings.

The department was fortunate in obtaining professional men [i.e. pharmacists] from outside the service to control these Base Depots. The work was extremely heavy and they were successful in keeping up requirements owing to their high standing and training in the pharmaceutical profession, which, being allied to the medical profession, enabled technical advice from medical men to be obtained when required.

A matter of great importance to those in Government service, however, is that these pharmacists—successful business men—were not conversant with the orthodox procedure in accounting for Government stores. The Auditor-General's representative, in ordinary course, comes along to check accounts; and these men, whose standing and ability were high, were placed in a most unenviable position. It would have cost much money to supply sufficient clerks to comply with the orthodox procedure, but it would have been worth while, as much time and money had later to be expended in correcting accounts. It would also have relieved these temporary officers from a responsibility for which they had no previous training.

¹² In the supply of equipment for transports and hospital ships the Navy took the place of "Q" and "Works" Branches of the Defence Department.

The developments within Australia have also been described in the highly valuable but unpublished "Record of War Activities" compiled by the Defence Department at the end of 1917. This states that the functions of the Central Depot of Medical Stores (organised on the initiative of the Staff Officer for Pharmaceutical Services on the D.G.M.S.'s headquarters)¹³ were—

1. To arrange for the supply, purchase, or manufacture and subsequent distribution to districts of drugs, and medicines, surgical, dental and veterinary instruments, as well as various medical and surgical dressings and sundries usually supplied by chemists.

2. Manufacture of such medical preparations as can be done to advantage.

The establishment of the Base Depot consisted of—

- 1 quartermaster (pharmacist) with rank of honorary lieutenant.

- 4 staff-sergeants as assistants (1 chemist, 1 surgical instrument and dressing, 1 clerk, 1 dental supplies).

The staffs of the District Sub-Depots and in the General Hospitals were considerably greater; for example, in the 3rd Military District (Victoria) the depot staff consisted in 1918 of—1 captain (honorary captain and quartermaster), 2 warrant officers, 1 staff-sergeant, 7 sergeants, 1 corporal and 5 civilians.

The problem of drug supply in the six districts may be illustrated by the following account of the experience in Queensland:

In the early days following the outbreak of war, a small depot was established, in connexion with the office of the Principal Medical Officer, for the supply of drugs in camp. A pharmacist from an Australian Imperial Force unit was detailed for duty there, and drugs were purchased as required and sent on to various camps. The available accommodation proved inadequate, and with the increase in the size of the camps it was found necessary to establish an advanced base depot in the centre of the camps, from which they drew all their supplies. Hospitals and the advanced depot were at this time drawing their supplies through ordnance stores from various wholesale drug houses. While the supplies required were generally available the cost was considerable.

The appointment of Captain R. C. Cowley, as Senior Pharmacist, early in 1916, was a decided step in advance. With the subsequent establishment of a Base Depot, the whole matter of the supply of drugs was soon on a satisfactory basis. The depot was established in a convenient drill shed, which was at comparatively slight cost adapted for the purpose which it has served admirably. In addition to storage and issuing of

¹³ In Feb. 1916 Mr. D. A. Cossar was appointed Pharmaceutical Staff Officer to the D.G.M.S. with the rank of Honorary Captain (later Major).

drugs a considerable amount of dispensing is done at the depot, and accommodation is available for dental and veterinary stores. The appointment of a quartermaster to this depot (Lieutenant G. P. Doyle) was particularly fortunate, and this officer has, by his keen business acumen, contributed largely to the success of the store. In the first instance, practically all supplies were obtained locally from the cheapest source, and a great saving resulted immediately. Later, under a system of contract, drugs were furnished from various States as well as Central Base Depot Medical Stores, Melbourne, so that local purchases have been few and only sufficient to tide over a temporary shortage. All supplies received are subjected to a rigid inspection, and, in suspicious cases, to analysis by the Senior Pharmacist. In the majority of cases they satisfy the tests of the British Pharmacopoeia.

The value of drugs purchased for the Base Depot from the date of its establishment to 30th June 1916, was £4,510. Not only are all hospitals and camps supplied from this depot, but transports are also stocked with all medical and surgical equipment; from this source the result is an average saving of £50 per transport of 1,000 men, as compared with the cost before the depot was established.

One result of the stringency of material, especially drugs,¹⁴ surgical dressings, fine glassware and instruments—was a very considerable extension of manufacture in Australia.¹⁵ In this matter the Government was greatly assisted by the Pharmaceutical Society of Australia on whose nomination the wide knowledge of Mr. R. C. Cowley was made available to the Federal Government.¹⁶ By far the most important result, however, was the formation of the Commonwealth Serum Laboratory. An account of this, prepared for the history by the Director-General of Health, Dr. J. H. L. Cumpston,¹⁷ will be found in *Chapter XV*.

The problem of profiteering. Early in 1916 the attention of the Director-General of Medical Services was drawn by a Member of Parliament to supposed over-charges and profiteering on the part of certain firms. An inquiry under the *War Precautions Act of 1914-16* was carried out by Colonel J. B. Laing, who submitted a voluminous and instructive report.

¹⁴ The drugs chiefly affected are stated to have been aspirin, antipyrin, chloral, veronal, urotropin, salvarsan, and a number of other preparations. Other articles affected were surgical dressings and bandages. (*Australian Official History, Vol. XI, p. 522.*)

¹⁵ *Australia During the War*, by Ernest Scott, pp. 522, and 546-52.

¹⁶ Manufacture was fostered in some instances by relaxation of conditions as to enemy patents.

¹⁷ During the war Dr. Cumpston acted as "Adviser in Sanitation" with the rank of Lieut.-Colonel.

It cannot be said that any very heinous departures from honest dealing were disclosed but the Commissioner made a number of useful observations and recommendations calculated to decrease the cost to the public funds. Briefly he recommended the formation of a board of three officers, medical and pharmaceutical, to lay down standard formulae and specifications so as to avoid, for example, such action as the following:

161 distinct preparations, aperients, tonics and expectorants, etc., were demanded by Senior Medical Officers, notwithstanding the fact that a full supply of drugs, etc., for preparations of similar therapeutical value may have been held by them at the same time.

Seeing that qualified pharmaceutical chemists in Australia were ready to serve abroad, the D.G.M.S. in May 1917 advised the War Office that fifty were available for Imperial hospitals and would be granted the rank of staff-sergeant. In June the War Office replied, gladly accepting them for service in India. These staff-sergeant dispensers arrived in India towards the end of 1917 and were distributed to hospitals at Poona and Deolali, where also Australian nurses were serving. Difficulties of pay, allowance, and equipment soon became apparent, and much discontent arose among these dispensers regarding conditions in general. The complaints were investigated by the Director-General (General Fetherston) during his return from an inspection overseas towards the end of 1918, and they were granted warrant officer rank while in India, but without increase in pay. Their service in India ended in January 1919.

The transports for the First Convoy which left Australia in October 1914 were equipped to a scale bounded only by the requirements of the voyage as conjectured by the Australian medical officers in the main ports of departure.¹⁸ The only data available were Admiralty regulations—which were found quite inapplicable—and such records as existed of transport experience in the South African War. To cut a long and incredibly muddled story short—the first transports were equipped on a scale which though it left a surplus sufficient to furnish

¹⁸ The responsible officer in N.S.W. (Capt. A. H. Moseley) has recorded that his only instruction was that there should be no shortage. He would himself "be held personally responsible" if such occurred.

a medical stores depot in Egypt, made necessary large purchases *en route*, and contained drugs the benefit of whose inclusion was not to the soldiers.¹⁹

During the first year the stream of "medical stores" through the transports (including stores provided by the "Red Cross") flowed to Egypt. In the second year the stream was reversed—local supplies becoming depleted. A standardised schedule for the transports was then evolved, and urgent demands were made on Australian Headquarters in Egypt not only for the return of surplus, but for extra supply to be sent back by transports returning with invalids, to stock the Base and District Medical Depots in Australia. In the last stage of the war the Australian Medical Stores Depots in England and Egypt became a widow's cruse serving all requirements of Australian units and Command Depots in England, homeward bound hospital ships and invalid carriers, and medical depots in Australia.

The final problem of the supply of medical stores to transports came with the huge job of repatriating the force and its new camp followers (women and children). Major Sykes says:

Although the scale of medical supplies for transports was not finally adjusted until 1917, the service can be congratulated on the fact that no serious consequences arose on account of omissions or insufficiency.

The standardised equipment tables for the troop transports leaving Australia and the invalid carriers returning thither were a really important aid to efficiency and economy.

I

MEDICAL SUPPLY IN THE FIELD

The *replenishing of medical and surgical equipment* was said by *Field Service Regulations* to be one of the four prime responsibilities of the Army Medical Service. "All these functions," it was stated, "are of equal importance, because no one of them can be performed efficiently without the others." As the British medical historian, Sir W. G. Macpherson, says in the opening passage of the chapter on this subject in the *British Official Medical History*, "medical and surgical supplies are to the Army Medical Service what ammunition is to the fighting troops".

¹⁹ For example a quantity of liquid extract of ergot.

In both the British and the Australian Armies the technical equipment of the medical service was provided from three distinct sources.

**Nature of
medical supplies**

1. The medical service itself was responsible for the supply and distribution of drugs and organic products, surgical dressings and instruments, hospital furniture and all special medical, dental and nursing equipment and appliances. In general for all technical material required by the medical service not specifically excluded. Many also of the articles supplied by the "Q" Branch were held in medical depots.

2. The Army Service Corps (Supply) furnished special invalid foods—as "medical comforts"—and crude disinfectants in bulk.

3. The Army Ordnance Department issued bedsteads and bedding and general hospital equipment such as crockery, bed pans, and similar articles, stoves, furniture (except special hospital furniture), blankets, stretchers and tents. This department also issued the "first field dressing" carried as part of his equipment by every soldier.²⁰

Supplementary to all of these, and independent, sometimes duplicating and overlapping if special circumstances had to be quickly met or military routine forestalled, was the *Red Cross supply*. It included also unique and homely provision—for example, of old linen—as well as that of domestic and nursing appliances, special instruments, minor luxuries, etc. As the instrument of voluntary aid provided for in the Geneva Convention it was an important, if somewhat unregulated source of amenities.²¹

These four types of medical supply may be said to have come together only as they were delivered into the hospital ward, the ambulance tent, relay post, regimental aid post, or—in the case of the "first field dressing"—into the "right hand inner pocket" of the soldier's tunic. The military organisation for assembling them despite all the terrific vicissitudes of war fell short of none of the three other tasks of the medical service in the elaboration of the machinery and the skill and devotion required to achieve success.

²⁰ The special "shell dressing" (*q.v.*) was a medical supply.

²¹ Its activities are referred to in *Chap. xviii*.

The medical service stands or falls by the efficiency of the performance of this responsibility. The administrative and

executive services charged with it were:

Personnel

(1) the Quartermaster-General's Branch and the services of supply, "Army Service Corps" and "Army Ordnance Corps", helped by the "quartermaster" personnel in the units; (2) the medical service itself, through the medical supply department. The more technical, pharmaceutical tasks of this department were commonly allotted to members of the Army Service of Compounders or, as it became in the Australian forces, the Army Pharmaceutical Service; and so, more commonly, was the actual dispensing of medical stores.

Few medical officers in the Australian Army Medical Service had exact knowledge of the details of the system of supply. Many administrative and most commanding officers depended on "Q" or on their quartermaster to an extent that would have been full of risk in any other field of medical responsibility. Even in this it did not conduce to "efficiency"—as witness the stupendous waste of medical stores on both the Eastern and Western Fronts²² and the perpetual troubles and trials of quartermasters. This chapter affords indeed a welcome opportunity for paying tribute to the personnel—quartermaster and pharmaceutical—responsible for providing the munitions of medical service in Australian medical units, in the field and at the Base.

Within each medical unit itself, as in every other unit, "supply" and "ordnance" stores were obtained and distributed by the Quartermaster's Department. In the

**A.I.F. in the field
—Army Service
and Ordnance
Supplies**

Australian Army this officer and his personnel were part of the establishment of medical units. Their group represented (one may say) the "grocer" element of the ancient compact and modern conflict between the profession of the apothecary—here in the person and the department of the pharmacist—and the "trade" of "grocery".

But both the duties and the status of the quartermaster had come to embrace much more than would logically be supposed.

²² The waste of dressings in casualty clearing stations was the subject of special note in a report by Lieut.-Col. Newland to the D.M.S., A.I.F. in 1917. The loss of equipment and stores abandoned in 1918 is described in *Vol. II (Chap. xx)*.

The term "Quartermaster" connoted at once a duty and a rank, the latter arising out of the former. The duties of the quartermaster reflected broadly the general functions of the Quartermaster-General's Branch of the Army. His importance in a medical unit was at least on a par with his place on the combatant side. The arrangement in the Armies

The Quartermaster's Department of the British Commonwealth, whereby all "officers" in the Army Medical Service were members of the medical profession, made necessary the creation of an executive department to direct and control the non-professional activities necessary to each unit's life. The quartermaster had to maintain food supplies and control equipment; and usually, also, to direct the activities of the "warrant" officer in charge of "general duties" personnel. General control was exercised by the Commanding Officer, and often took the form of a chronic feud between the medical officer designated as "adjutant" and the quartermaster.

In addition the Quartermaster's Department was intimately concerned in all problems of transportation. In a lecture to the A.I.F. reinforcement depot at Hurdcott, Captain Pollard said:²³

The quartermaster is the key pin on which a unit turns as he is responsible to his commanding officer for the provision, care, and distribution of all articles of equipment, food and clothing. The quartermaster must be keen and alert, a business man and in constant touch with ordnance, supply and R.E. Depots from which he obtains his supplies. Quartermasters too often rely overmuch upon their quartermaster sergeant and storeman. The Q.M. should himself thoroughly organise and train the staff under his control and maintain constant supervision over the work of his different departments.

The quartermaster's duties may be summarised under the headings of (1) Equipment, including the replenishment of field units and R.M.O's from the nearest field ambulance. (2) Food supply, including the preparation of food, feeding of patients and personnel, prevention of waste, supervision of cooks and cookhouses and (by no means least in the latter part of the war) the devising of menus and recipes. (3) Clothing and personal equipment (ordnance). (4) Medical and surgical supplies from the Advanced Depot of Medical Stores; and Red Cross. Finally the running of the "pack store".

The duties of the quartermaster in a general hospital were the subject of recommendations to the D.G.M.S. in Australia by Captain J. A. Heath, who was sent to report on the working of the Australian Service:

²³ His words are here epitomised.

There is not sufficient work in a General Hospital to fully occupy the time of two quartermasters especially now that General Hospitals have on their establishment a quartermaster-sergeant and at No. 14 A.G.H. where all the surgical stores and stores for special departments as X-ray, Pathological, etc., are placed under the lieutenant dispenser there is less reason for two quartermasters than at R.A.M.C. hospitals where all these stores are under the quartermaster.

Regarding the responsibility of equipment after being issued by the quartermaster or the dispenser; in the Australian hospitals this has always been a very sore point and it is a constant cause of trouble. In the R.A.M.C. hospitals the responsibility is placed on different people in different hospitals as there is not a uniform system in use. After seeing different systems I recommend the following: All linen, surgical and medical stores and apparatus to be on charge to the nursing sister in charge of the ward; all other stores in the ward to be on charge to wardmaster or ward N.C.O. The ward medical officer to be responsible to higher authority that his ward is properly equipped at all times.

I recommend this system because it releases nobody from the responsibility that at all times the wards are properly equipped. . . .

It is wrongly thought by a lot of medical officers that the quartermaster is responsible for all stores in the hospital and they work under this misunderstanding. If my recommendation is adopted it will not relieve the quartermaster of his proper responsibility but will fix, after issue by the quartermaster, the responsibility on everybody concerned with equipment or stores.

All stores, etc., on issue to the staff lines (should) be held on inventory and on charge to the Company Officer, or if there is not a Company Officer then by the Warrant or Senior N.C. Officers in charge of sections; by sections is meant those employed in nursing duties, those in general duties, and those employed on administrative work.

Perhaps it may be thought that, being on service, I am paying too much attention to the subject of stores; but when the importance of such is realised, the cost of same, and the great difficulty in obtaining some of them (and this difficulty is becoming greater) it will be worth while giving the matter every attention. In any case, if not adopted here on service, it is a recommendation that will hold good for hospitals in Australia.

The report was forwarded to the Director-General by the A.D.M.S., A.I.F. in Egypt (Colonel R. M. Downes) with critical annotations. As these criticisms did not include the recommendations here quoted, these were presumably approved.

Distribution of medical supplies at the seat of war—at the Base, on the lines of communication, and in the field—was effected through *Base Depots* of Medical Stores, situated at or near Expeditionary Base, and *Advanced Depots* at or near railhead. Both were under the control of the Inspector-General of Communi-

Distribution in the field

cations.²⁴ The advanced depots supplied the field units (C.C.S., field ambulances, sanitary sections and regimental establishments), and replenished themselves from the Base Depots, from which also the general and stationary hospitals commonly drew their supplies. They were commanded by medical officers.

On the lines of communication and at the Base the conditions of transport allowed approximation to civil methods. The requirements for units in the field however differed fundamentally from these. Here stores had to be compact, portable, and ready for immediate use. To achieve this and to simplify dispensing drugs were supplied so far as possible in tablet form and the dressings compressed. Supplies were contained in special "panniers" and other carriers, made and fitted to sealed pattern.

While however in moving warfare the field units were fairly strictly confined to their panniers, in the stationary

²⁴ A BASE DEPOT OF MEDICAL STORES
War Establishment

Detail	Officers	Staff-Sgts. and Sgts.	Rank and File	Total	Remarks
Major	1	—	—	1	(a) One to be a carpenter, for whom a tool chest will be provided.
Quartermaster ..	1	—	—	1	
Dispenser and Clerk	—	1	—	1	
Packers and Storemen ..	—	—	4 (a)	4	
Cutler	—	—	1	1	
Batmen	—	—	2	2	
Total	2	1	7	10	

AN ADVANCED DEPOT OF MEDICAL STORES
War Establishment

Detail	Officers	Staff-Sgts. and Sgts.	Rank and File	Total	Riding Horses	Remarks
Major	1	—	—	1	1	(a) Is a Corporal (b) One to be a carpenter, for whom a tool chest will be provided.
Dispenser	—	1	—	1	—	
Clerk	—	—	1 (a)	1	—	
Packers and Storemen ..	—	—	2 (b)	2	—	
Batmen	—	—	1	1	—	
Total	1	1	4	6	1	

or attrition warfare, that on every front was sandwiched into the war of movement, dressings, splints, furniture and drugs were supplied to the clearing hospitals and even to field units in the form normal to civil practice. Indeed towards the end of the stationary period the issues of medical stores and extra equipment "Additional to Mobilisation Table" reached dimensions that necessitated astounding orgies of discarding when, in the big German offensive in March 1918, mobile warfare was suddenly—if not unexpectedly—resumed.²⁵ Speaking broadly however the problem of medical supply in the field was based upon portability, and was strictly systematised and regulated, though subject to variations in the nature of the drugs, dressings and equipment—in particular, splints—reflecting advances in scientific knowledge or the results of experience, or dictated by shortage of supplies.

In the matter of supplies in the field the experience of the Australian Service was nowhere special or individual. The supply was part of the arrangement for co-operation arrived at severally between Great Britain and the various dominions, and was paid for under the capitation agreement.²⁶ A few points concerning supplies and equipment, however, should be noted.

The Great War found the medical profession on the breaking crest of the wave of polypharmacy that came with and was in a great part created by the pharmacological identification and subsequent mass-production—in variety as in quantity—of the synthetic drugs; which itself followed the isolation of the alkaloids and the synthesis, chiefly by pharmaceutical chemists, of urea (Wöhler 1828), salicin and chloral hydrate (Liebig 1830-32), acetyl-salicylic acid (Gerhardt 1853), veronal (Emil Fischer 1904) and a great host of others. Very many of these drugs were of the analgesic, sedative and "antipyretic" type, and the co-incidence of this almost unlimited supply with the huge incidence of "P.U.O." during the war created a major problem of medical supply.²⁷

**Medical stores
—drugs and
dressings**

²⁵ See Vol. II, p. 641.

²⁶ See Vol. I, p. 57, Vol. II, pp. 826-7.

²⁷ The situation brought about at Gallipoli by the demand for these drugs was one of the major medical features of that campaign, and was examined in Vol. I.

It is not necessary to traverse in detail the *materia medica* which came within the range of medical stores supplied by the Base and advanced depots. It is however desirable to note that in this war first the supply of biological products—vaccines, sera, etc.—became a major problem. The introduction of compulsory vaccination and inoculation in the Australian force created a considerable problem in Australia, which received attention in *Volume I*. Overseas, the Australian force was dependent on British supplies. These (after a brief initial breakdown) were admirably organised and efficient, the Lister Institute being made responsible for the supply of specific diagnostic and therapeutic sera, the vaccine department of the Royal Army Medical College for vaccines (of which 24 varieties were supplied).

As to equipment, the "field fracture box" was fitted with standardised material for splinting, in the form of aluminium or malleable steel bars hinged to facilitate improvisation. The "A. to H." series of panniers were similarly adapted for every medical requirement. Each had its exact content—drugs, dressings, equipment and so forth. It must be added that, in the circumstances of that war, many field ambulances carried some of their panniers unopened from the first year of the war till the last. It is unnecessary to examine the nature of the stores.²⁸

One general lesson seems however to emerge—that the mass warfare of to-day requires close attention to the provision and control of equipment and stores "Additional to Mobilisation Store Table". A second lesson is that medical officers should be compelled to learn to exercise their craft with the drugs and instruments officially provided; and that resort to special implements—whether provided by the Army or the Red Cross (which was thus called in too often in the last war)—should be strictly controlled.

Both in the British and the Australian forces the huge variety of special medical supplies was summarised in a general way in a "Priced Vocabulary of Stores" (*"wholesale"*); for distribution it was listed in detail in "Mobilisation Store Tables" (*"retail"*). The system of medical supply in the Army was

**British system
of supply**

²⁸ The list has been completely revised since those days.

based on these. In the British Army the procurement of these articles and the maintenance of reserve of them was effected through a special sub-department of the Director-General of Medical Services at the War Office. The Army's supply was safeguarded by maintaining large reserves in Great Britain and, during the war, at the most important Expeditionary Bases. The following summary of the British method has been drawn chiefly from *British Official Medical History*:

The Army Medical Stores at Woolwich formed the main centre from which supplies were drawn. At the outbreak of war there were two subsidiary stores, one at Southampton, and the other at Dublin. The stores at Woolwich rapidly increased in size. The value of the material held in reserve there had been about £100,000 prior to the war, but had risen to about £1,000,000 by the end of 1917. In addition to these establishments depots of medical stores were opened throughout the United Kingdom.

The central administration was the Medical Supplies Branch of the War Office. This, like the stores, was completely reorganised during the war and divided into sections—e.g. for field medical equipment, drugs (including tablets), surgical dressings of all kinds, surgical instruments and sterilizers, operating room furniture, cylinders of oxygen and nitrous oxide, medical and surgical appliances (including rubber goods), splints, electro-medical and mechano-therapeutic outfits, vaccines and sera, pathological and bacteriological outfits, X-ray outfits, dental outfits, spectacles, home indents, overseas indents, shipping of stores, contracts, returns, accounts, and registers.

The general system adopted for complying with indents received at the War Office from medical store depots and hospitals was as follows: The indent was passed to the contractor concerned with a three, seven, or ten days' label attached, according to the urgency of the demand. On receipt from the contractors of lists of articles which they were unable to supply within the specified period, indents for these were sent to the Army Medical Store or Army Medical Reserve Store, as the case might be, for supply. If the indents contained any articles which the Army Medical Stores were unable to supply, the officer in charge at once reported to the War Office, when special arrangements were made to procure them from the trade, or to expedite their supply by the contractors.

Sixteen base depots of medical stores were established with the various armies in the field, five in France, three in Salonika, three in Egypt, one each in Mesopotamia, Bombay and Italy, and two in North Russia. From all of these very frequent indents for immense quantities of medical and surgical stores were received. In addition, base store depots were established at Cairo, Malta, Nairobi, and Dar-es-Salaam, as well as thirty advanced depots in the various areas of operations.

The British depots were nothing more than distributing points. All stores, instruments, etc., were purchased in huge quantities from wholesale houses, generally under contract, and were then sent to Woolwich, re-packed in smaller quantities, and sent where required. *Drugs, dress-*

ings, bandages, etc., were always purchased from the contractors in the form in which they were going to be issued to field or other small units, and the original container obtained from the contractor was rarely interfered with until opened in the dispensary for use. No manufacturing work of any kind was done at the Base Depot of Medical Stores; . . . the depots were distributing points only.

The principle governing all depots was that units in the field carried a fortnight's supply and indented on the advanced depot once a fortnight. The advanced depot carried a month's supply and indented on a Base Depot once a month. A Base Depot carried three months' supply. Certain central depots, such as the "Levant" Depot, carried six month's supply and indented on Woolwich once in six months. The main depot at Woolwich carried twelve months' supply. All General Hospitals carried approximately one month's supply and indented monthly on their respective Base Depots of Medical Stores. Emergencies were continually occurring and special indents were sent in; but for routine purposes the system above described held good.

On the other hand, on the advice of the Senior Pharmaceutical Officer in Australia, Major D. A. Cossar, the D.G.M.S. in Australia accepted a policy of dispensing, and even of manufacture, at the distributing depots in the Australian States, where (it would seem) this system effected a considerable saving of money. In August 1917 Major Cossar was sent by the D.G.M.S. to inspect Australian arrangements in Egypt and England. Basing his opinion on his observations of the British Base Depot of Medical Stores in Cairo, Major Cossar made the following criticisms:

After spending the whole day at this depot, I came to the conclusion that, were it possible for a Base Depot of Medical Stores, run on the same lines as in Australia, to supply A.I.F. units in the field with medical and surgical stores, the supply could be made at a much reduced cost, probably 50 per cent. In support of this contention I ascertained that at this depot over 100 Winchester quarts of distilled water had been sent across from England. The price of the containers alone would have bought a still that would have distilled all the water required for the A.I.F. in Egypt. The wastage in shipping space on this one line would be considerable, for as soon as these bottles were empty, they were packed up and returned to England to be refilled and sent back to Egypt.

Distilled water is mentioned first, not because it was the worst example of wasteful methods but because it was the first which came under notice. A similar waste occurred in connection with diluted Rose Water which could have been sent in a 1 in 40 concentration to be diluted as required at the depot. On further enquiry I found that hundreds of cases of solutions were sent from England to Egypt. The effect of this was that, out of every 100 cases of these lines sent from England, 99 represented waste space; and here again, as soon as these bottles were emptied, they were shipped to England to be refilled and returned.

The whole of this wastage of shipping space (and it represented a

considerable amount) could have been saved by the employment of half a dozen manufacturing chemists in the Base Depot of Medical Stores at Abbassia. An officer with full knowledge of the drug trade, in charge of this depot, could with the greatest of ease, reduce the shipping space to at least half of what it is at present,

(1) by indenting for many of the articles in bulk,

(2) by "breaking down" concentrated solutions to suitable containers at the depot.

To mention one line as an example, bicarbonate of potash in a hundredweight keg would take up a small space on a transport; but when it goes to Egypt, as at present, in 2 lb. bottles, the necessary packing makes two big cases.

This opinion was supported by the Director-General in Australia, and was strongly urged on the D.M.S., A.I.F. It is however clear that the British and Australian problems were essentially different. The prime duty of the military depots of medical stores was distribution, and this must be accomplished "regardless of expense". The case was well put by another Staff Officer (Captain J. A. Heath):²⁹

Base Depots of Medical Stores in Australia are to all intents and purposes like a wholesale manufacturing chemist's warehouse, and it is this difference that is noticeable when visiting British Depots of Medical Stores. The British depots are nothing more or less than distributing points. All stores, instruments, etc., are purchased in huge quantities from wholesale houses under contract for the most part, sent to Woolwich, re-packed in smaller quantities and sent wherever required. In all cases drugs, dressings, bandages, etc., are purchased from the contractors in the form in which they are going to be issued to field or other small units, the original container obtained from the contractor is rarely interfered with until opened in the dispensary for use. No manufacturing work of any kind is done at Base Depots of Medical Stores and it is only in the case of some very rarely used drug or at an advanced depot that an original bottle, package or container is opened, thus the depots are distributing points only and in this way differ so much from those in Australia. In Australia a lot of manufacturing work is done and dispensing of stock mixtures which are sent out to all hospitals. Although there is so much done at the B.D.M.S. it has not relieved the number of dispensers employed in hospitals and there is a large staff employed in each depot. Some small saving may have been made in making up stock mixtures at one central place but it is more than counterbalanced by the number of men employed at the B.D.M.S., and freight paid on added water, etc., when the mixture is made and sent by rail or otherwise.

Now that I have had an opportunity of seeing the British system I have no hesitation in saying that the Australian system is wrong.

²⁹ Capt Heath was a quartermaster and hon. captain in the A.A.M.C. (Permanent) and had been detailed by the D.G.M.S. to take the Australian Camel Field Ambulance to Egypt, and to furnish him with a report on military medical organisation and work.

Undoubtedly the best system is to purchase in the form in which you will issue and thus save lots of time, trouble and expense. Then again, how much easier is it for keeping account of stock, etc.; this system is far ahead of the one adopted in Australia and requires far less personnel.

On 16th September 1914, Surgeon-General Williams proposed to the Chief of the General Staff in Australia, Colonel

Evolution of medical supply system in A.I.F. J. G. Legge, that one Advanced and one Base Depot of Medical Stores should be sent with the line of communication units then being raised for service with the A.I.F. Colonel Legge agreed that such units would be necessary but stated that they would be provided by the War Office.

The immediate effect of this decision was curious and far-reaching. In the absence of any assured official source of medical supplies after leaving Australia General Williams had resort to a semi-official exploitation of voluntary donations through the Red Cross Society. The result was the "Red Cross vote". The history of this "vote" and its effect on the outlook of the Australian Medical Director in this problem has been recorded in the first volume of this history.³⁰ It brought about a reliance on this unregulated, irresponsible, and uncertain source of medical supplies as *replacing*, instead of *supplementing*—as properly it should—the official sources. The effect of this tragic error has been followed throughout the Gallipoli Campaign. It helped to bring about the deplorable administrative fiasco which in 1915 threw the Australian Medical Service into a chaos that was only resolved by the *tour de force* by which the D.D.M.S. of the Anzac Corps, Colonel Howse, through the D.G.M.S. for Australia, Surgeon-General Fetherston, forced on the War Office the acceptance of a Director of Medical Services for the A.I.F. and achieved his own appointment thereto. In spite of the enlightened administration of the Red Cross fund in Egypt by the A.D.M.S. for A.I.F. there, Lieut.-Colonel James Barrett,³¹ Australian medical officers on the spot and at the Dardanelles as well as the public in Australia bitterly assailed that administration and forced Colonel Barrett's

³⁰ See especially pp 30, 37, 360, 388.

³¹ This very able officer held that position as a personal appointment on the staff of the D.M.S. for Egypt, not of the G.O.C., A.I.F.

resignation.³² The situation was brought to a "show down" in the notorious "Red Cross enquiry" in which the Australian attitude in the matter of Red Cross supplies was shown to be subversive of the effective conduct of medical responsibilities.

The second result was as irregular and more lasting. To provide some immediate reserve of stores wherever the force disembarked Surgeon-General Williams arranged for a huge excess of voyage stores. As already stated, they were selected on no system and were a very heterogeneous assortment. From these an improvised store was formed at Mena Camp in Egypt. The system of supply from this "depot" during the Gallipoli Campaign was only less irregular and uncertain than that from the Red Cross; but before tracing its development into the immense establishment that grew from this unpromising beginning, it is desirable however to record a far more important and impressive episode of Imperial relations—due to an act of Imperial statesmanship which freed the co-operating dominions from the problems of supply for which they were wholly unprepared.

This was the arrangement, already referred to, by which, instead of keeping complicated accounts of every item of British food or equipment passed to the dominion forces, and every gun, rifle, or surplus box of biscuits handed back, the dominions paid a fixed sum for every one of their soldiers in certain conditions and the mother country supplied them by the same channels and methods as her own troops. Such were the commonsense effectiveness of this agreement, and the sympathetic and generous spirit in which the principles of it were applied by Great Britain, that, unlike many financial arrangements, it served to promote rather than to disturb the cordiality of relations.

The establishment of the "Australian Intermediate Base Depot" in Egypt on the scheme drafted by Colonel Brudenell White has been described in *Volume I* of this work,³³ as has the decision of the War Office to charge two shillings per man daily for Australians and New Zealanders treated in ordinary

³² This was brought about directly by a War Office enquiry instigated from Australia in which the Red Cross fund question was a major complaint.

³³ p. 55 *et seq.*

**Financial
arrangements
for stores**

British hospitals in Egypt but nothing for accommodation (other than cost of billeting) or for "barrack and hospital stores", or cost of land travelling after disembarkation in Egypt. The letter from the War Office of 10th December 1914 informing the command there of this decision added:

While engaged in active operations supplies should be issued free of charge while these conditions continue.

This War Office letter formed a basis whereon payments in respect to medical service during the war were adjusted to the extent of millions of pounds in a way highly favourable to the Commonwealth Government. Full import of the arrangement was, however, not altogether recognised at this time either in the A.I.F. or in Australia. The responsibility accepted by Great Britain to provide all accommodation was understood, but the provision of certain medical equipment and necessities was frequently in question, and was almost certainly misinterpreted by the Egyptian Command and by A.I.F. Headquarters where the agreement received very little notice.

There is no evidence as to what meaning was generally attached at this time to the phrase "no charge will be made for barrack and hospital stores". It seems to have been taken as referring in a general way to non-expendable stores, and *not* to hospital furniture³⁴ as at this time no Australian hospitals had been allocated to Egypt.

In his despatch on 8th January 1915 the G.O.C., A.I.F. (General Bridges) included an outline of the functions of an "Intermediate Base" that was then about to be formed in Egypt. It would include a medical section whose duties were defined as follows:

The functions of the medical section should be similar to those of the ordnance section. All medical and Red Cross stores now in possession of the dominion forces should be taken over by it or procured when necessary by indent on the D.D.M.S. Army Headquarters (Egypt).

In providing hospital accommodation in cases that cannot be treated by field ambulances, this section should aid the D.D.M.S. in the administrative arrangements and in determining the incidence of cost.

³⁴ Thus the paymaster was not included in the conference summoned by the Officer Commanding the "Australian Intermediate Base Depot" (Col Sellheim) to consider the expansion of No. 1 Australian General Hospital in preparation for the Gallipoli wounded. Also No. 2 A.G.H. was withheld for some time from taking over furnished buildings (the Gezireh Palace Hotel) on account of the expense involved

While the principle should be that stores provided by a dominion should be for the use of the force of that dominion, in cases where this is impracticable or inadvisable the section should record their issues elsewhere and arrange for Australia to be credited accordingly.

It will probably be found convenient for all medical stores to be procured by indent on the British Depot of Medical Stores, who should take over, and place in charge of the depot, all stores provided by dominions.

In the ultimate arrangement subsequently arrived at a *per capita* payment was agreed on, to be made by Australia to Great Britain for equipping and maintaining Australian troops overseas. An analysis of the adjustment arranged for the Gallipoli Campaign, showing the relative place occupied by medical supplies is given in the subjoined table:³⁵

	s.	d.
Rations	1	10
Forage		5
Clothing	1	3
Equipment and General Stores:		
Man's personal equipment, <i>Barrack Hospital Stores</i> ,		
Prison stores, and sandbags		8
Fuel, <i>Drugs</i> , Stationery, etc.		1½
Ammunition:		
Guns and Bombs		8½
Small arms		3½
	1/-	1 0
Small arms, maintenance and replacement		3
Warlike Stores:		
Repairs and upkeep, artillery, transport vehicles, signal and electrical stores		6
Horses replacement		1
Sea transport		3
		6 4½

Total rounded off at 6/- per head per day.

The *Australian Official History* records that in the final reckoning after the war Great Britain evinced a spirit in every way as generous as that in forming the original agreement.

The first of the two chief fields of operation of this agreement was supply in the field; in this full responsibility for

³⁵ The items of direct medical interest are here italicised. The payment varied slightly from time to time during the war, in accordance chiefly with the expenditure of artillery ammunition. The details of the arrangement and final adjustment of the financial position are described in Vol. XI of the *Official History* (Prof. E. Scott).

maintaining supplies to the Australian force had by the agreement been taken over by the British Army. But at the Base both in Egypt and in England Australia took over increasing responsibility which culminated in the creation of the Australian Base Depot of Medical Stores; financed by Australia, but ultimately included in the "Imperial" adjustment.

Mention has already been made of the immense surplus of medical stores brought from Australia in the original transports. The problem of Surgeon-General Williams and his "staff"³⁶ in dealing with these in Egypt became so pressing³⁷ that the D.M.S. cabled urgently to Australia asking that approval for both Advanced and Base Depots of Medical Stores be obtained. "Impossible," he said, "to receive or distribute stores without the same." The reply from the Defence Department was the same as had already been given by Colonel Legge—"when units go to the front they will be part of organised armies for which Convalescent and Base Depots will be provided" by the British, and that "it would be presumption to send them". "New units will be formed only on the advice or request of the Imperial Government."

Surgeon-General Williams then interviewed the D.M.S. for Egypt, General Ford, who informed him that Advanced and Base Depots of Medical Stores would be ordered from England and no present action by the Commonwealth would be necessary.

But when the 1st Australian Division left for Gallipoli and the centre of the A.I.F.'s medical activities in Egypt passed to No. 1 A.G.H., Surgeon-General Williams arranged that a store should be created in the basement of the Heliopolis Palace³⁸ and a staff provided consisting of a medical officer to "superintend" each of the two sub-stores, medical and Red Cross, two nurses,³⁹ and five orderlies as clerk, packers and sorters.

The history of this store during the next nine months under the direction of Captain M. B. Johnson, is one of rapidly

³⁶ Staff-Sergeant John R. Drummond.

³⁷ In Feb., 1915, to make good a shortage in the B.E.F. in France Surg.-Gen. Williams on his own initiative passed to the British Service large supplies of anti-tetanic and anti-dysenteric serum obtained by him in England.

³⁸ What remained of the store at Mena House was transferred thither.

³⁹ Sister H. T. R. Samsing (in charge), and Sister M. I. Brown.

increasing development keeping pace with the growth of the A.I.F. Like the hospital itself the depot assumed, ultimately, very extensive, probably excessive, responsibilities in connection with the Australian force, and the transports.

On the principle that "in the absence of more definite information, and considering, as in war time we must consider" that he had to provide against "possibilities" rather than against "probabilities" Captain Johnson made arrangements to provide "for 10,000 men in hospital and for a maximum of 40,000 troops in training or in the field". To implement this policy an order was placed with the High Commissioner in London for drugs, dressings, and instruments to the value of £30,000, "being the calculated requirements for Australian Line of Communication Units during the next six months". This order—which was designated by the High Commissioner for Australia in London as "colossal"—could not be filled for many months. In the same month a large building was taken over and called, with the authority of the D.M.S. for Egypt, "The Australian Base Depot of Medical Stores".

In September an enterprising and exceedingly energetic officer, Captain A. L. Buchanan, was appointed to "command"⁴⁰ and under him the unit embarked on new and wide excursions into the sphere of medical supplies.

When the troops returned from Gallipoli and the Australian Medical Administrative Headquarters was created, the officer commanding the depot advised Surgeon-General Howse to arrange for an Australian "advanced depot" to be formed at Tel el Kebir to supply the camps, and that the equipping of the new force should be carried out by this Australian unit. This was done and much initiative was shown in this big responsibility.⁴¹

The Base Depot remained in Egypt until the middle of June when it was transferred to England. In May part of its immense medical, surgical, dental stores were sent to Australia, in view of shortage there, especially for equipping the transports. A full month's supply had been sent to France with the Australian hospitals. There still remained in Egypt £15,000 worth of goods

⁴⁰ Toward the end of December, 1915, a dental quartermaster arrived from Australia and took over the dental supplies section of the Australian Base Store.

⁴¹ For example, all the wicker panniers which formed the "A. to H." equipment of the field units were constructed locally to the order and specification of the unit's commander.

and these (by error⁴² which involved much expense and waste) were sent back to England in 3,000 cases.

England—The Command Depots. In 1915 there had been formed in England, at the suggestion of the War Office, a small Australian Medical Depot in Southampton. It had not yet been put into use, but it was now taken over and stocked, and a distributing store was also opened at the Headquarters of the Command Depots, Bhurtpore Barracks, Tidworth.⁴³ "Group" medical stores were opened at Codford and at Hurdcott (Nos. 4 and 3 Command Depots) and in December one at Larkhill to supply the 3rd Australian Division then in training. By January 1917 the Tidworth store was supplying medical, surgical and dental stores to over fifty different units and centres.

Transfer to London. So extensive had become the operations of the depot, and so difficult the problem of purchase of the immense quantity of equipment required, that at the end of 1917 it was decided to transfer it to London. This step, already decided on, was accelerated by the report of the Senior Pharmaceutical Officer from General Fetherston's staff in Australia, who as has been seen, severely criticised some features of supply and distribution, and who attributed the supposed failure to the fact that a pharmacist was not in command. By this time the dental section of the depot had become only less important than the strictly medical, in accordance with the great development of dentistry in the Australian force.

The transfer of the big store from Tidworth and the small one at Southampton to London took place in January 1918. The establishment was increased. The very complete records of the work of the unit during 1919⁴⁴ convey some idea of the extent of its operations.

They are conveniently presented by quotation from the

⁴² Due to lack of co-ordination between the Australian and British administration.

⁴³ A small depot store, already formed here, was absorbed.

⁴⁴ In particular a full history of the activities of the unit compiled at the request of the D.M.S., A.I.F., by Capt. C. S. Price and records covering the early operations in 1915 and 1916 compiled by Capt. M. B. Johnson and A. L. Buchanan. The early history of the administration of the D.M.S., A.I.F., Surg.-Gen. Williams in Egypt in 1915 is embodied in one of the best records of Australian experience held by the Australian War Memorial—the account of his work with Surg.-Gen. Williams by his staff officer, Quartermaster and Hon. Capt. J. R. Drummond. The monthly reports of this officer in 1919 give a complete account of the work of the unit during the demobilisation and repatriation of the A.I.F.

report of the Officer Commanding the Depot, Captain John Drummond.

"The repatriation of the A.I.F. caused a considerable increase in the activities of . . . the A.I.F. formations in England. That this Depot proved no exception will be readily appreciated when it is remembered that all transports conveying troops from England to Australia had to be supplied with medical stores sufficient for an 8 weeks' voyage; that during the greater part of 1919 the withdrawal of troops from France to England occasioned an increase in the issue of medical stores to concentration depots in England; that all medical stores surplus to "Mobilisation Store Tables" were returned to this Depot by A.I.F. medical units in France; that the whole of the medical stores on charge to A.I.F. hospitals and depots in England were returned to this Depot upon the closing of the various units; and finally that from July onwards the disposal of surplus stores claimed attention . . . by means of cash sales to medical officers or by transfer to the A.I.F. Disposals Board."

During the year 4,185 cases of drugs and sundries were issued to transports, 3,854 to units. In the same period 3,239 cases were received (in accordance with the policy noted above) from A.I.F. units, 3,381 from suppliers; while 182 individual transports were served in some way.

During the period 1,800 individual "lines" were in stock. 16,795 pounds of stock preparations were compounded, comprising 34 individual items, the most extensive being 3,310 lb. of Mist. Expect., and 3,100 lb. of Mist. Tussi.; 1,600 lb. of Liq. Arsenicalis were made.

Captain Drummond was unable to state whether the policy of compounding such lines in the depot had resulted in any monetary saving to the A.I.F.; but it had certainly proved "a distinct advantage".

It may be mentioned that the holding of large quantities of bonded stores caused an immense amount of labour in accounting to the Customs authorities.

The cost of indents for medical stores placed during the year amounted to £28,300.

At the end of June the O.C. was empowered to make cash sales to medical officers of surplus surgical instruments at a cost for "part worn instruments" of pre-war catalogue price plus 50 per cent. less 33½ per cent. Some resentment was felt at what was held to be a cheese-paring policy and the amount handed over to the A.I.F. Disposals Board far exceeded that disposed of in this way.

During 1918-19 the depot handled over a quarter of a million "Blue Light Outfits" for free issue. The whole of this activity—details of which will be found in *Chapter III*—was carried out under the terms of a Trust Fund. The other items in these operations were on a commensurate scale. The cost for drugs alone exceeded £20,000.

The Dental Store Depot was conducted independently by Captain S. M. Cordeaux, A.A.M.C. (Dental Services) being handed over to Captain Drummond in the middle of the year.

It remains only to record a few details concerning the equipping of "Family Ships". On each transport used for this purpose the depot placed a midwifery set and baby stores. The latter included, per infant, 2 lb. of Cod Liver Oil Emulsion, 2 lb. of Malt and Cod Liver Oil, 4 of Glaxo, 1 of unsweetened milk, 4 feeding bottles, with teats, 2 brushes, 1 dozen napkins, 1 dozen safety pins, 1 yard of india-rubber sheeting. A pair of baby scales, dill water, dusting powder, and liquid paraffin was supplied to each ship.

The total approximate cost of this contribution to the White Australia problem was £2,772.

II

THE ARMY SERVICE OF PHARMACY

The history of the service responsible for maintaining the supply and effecting the distribution of medical equipment and stores under the direction of the commissioned officers of the medical service has followed very closely the developments in the corresponding service in the civil community. The position of the pharmacist in the Army advances or recedes *pari passu* (speaking broadly) as his civil counterpart is occupied predominantly with science or with "trading".

The position of the Australian Army Pharmaceutical Service derived directly from the British system.

In the British "Regular" Army at its creation, and in the first century or so thereafter, the administrative heads of the Army Medical Service might be a Physician-General, Surgeon-General, or Apothecary-General.

Drugs and medical stores were looked after by Apothecaries . . . Dispensers [who were] warrant officers, but ranked as Ensigns for

quarters and allowances . . . were engaged for the larger non-regimental hospitals.

Supplies were dealt with by high officers, called Purveyors, who were sometimes Medical men.⁴⁵

Up to the Crimean War the Army organisation reflected the changes of the civil profession already described. Developments subsequent to that event, epochal in the history of the administrative and technical services of the British Army are described as follows:

A new race of apothecaries [arose] during the Crimean War, a warrant of 1854 having authorised the appointment of "Apothecaries to the Forces". These were not [at that time] medical men, but chemists, and were concerned mainly with the issue of drugs and medical stores. More dispensers of medicine also were taken on during the Crimean War (1854-1855), being employed even in regimental hospitals. They had been chemists in civil life. Some of them were gazetted to regiments as dispensers, ranking as Ensigns.⁴⁶ Apothecaries and dispensers were clothed in scarlet, but had different facings, the former having grey and the latter black velvet.

In 1856—the war in the Crimea being ended—a War Office Committee inquired into the question of compounding in the Army. It was elicited that from remote times hospital sergeants had compounded in regimental hospitals. These N.C.O's possessed no official qualifications as compounders. After much discussion between those in favour of the chemist-dispenser and those who preferred the soldier, the Committee recommended that a duly qualified compounder should form part of the medical establishment of every regiment, and that candidates should be selected from the Regular Army, or soldiers' orphans of the military asylum, trained for the work, and examined by a board. The scheme was adopted and became the normal way of filling the ranks of Army compounders generally. Specially engaged dispensers disappeared from the Army—some by discharge, others by becoming Apothecaries to the Forces. Modifications have been introduced from time to time as to the sources from which the candidates for the examination for compounders could be obtained, and the designation, dispenser has been resumed.⁴⁷

Australia. The same system was followed in the regular units of the British Army stationed in Australia in the early days and was continued after Federation in the Permanent Forces of the Commonwealth. When however registration of pharmacists became compulsory the qualification of the military "sergeant compounders" came into question. After much debate the qualification of the existing compounders was accepted but

⁴⁵ From *A Short History of the Royal Army Medical Corps* by Col Fred. Smith, R.A.M.C. (Second Edition, 1931), p. 4.

⁴⁶ Corresponding roughly to the commissioned rank of honorary lieutenant.

⁴⁷ *Ibid.*, pp. 14-15.

it was decided that men appointed in future must have a course of recognised pharmaceutical training.

In 1909 the Pharmaceutical Society of Australasia obtained recognition of the qualified pharmacist by the Australian Military Forces. An A.A.M.C. Reserve of Pharmacists with rank of Honorary Lieutenant was approved and a number of pharmacists joined. This Reserve was available for service in Australia and to fill vacancies in medical units on the lines of communications and at the Bases, but for service with field ambulances it was decided to follow British war establishments, in which dispensers were ranked as non-commissioned officers.

In March 1915 the Pharmaceutical Society of Australia considering that justice was not being done to qualified pharmacists took up the matter with the Minister for Defence; and at the end of that year the Deputy Director-General of Medical Services⁴⁸ submitted to the Adjutant-General a proposal for substantial increase in the status of the Pharmaceutical Service.

There is, and has been, for some time, a lot of dissatisfaction amongst the Pharmacists throughout Australia, in regard to their position in the Military Forces.

The Military Board agreed to the following establishment for the A.I.F.:

Unit.	Present.			Proposed.	
	Hon. Lieut.	Staff-Sergeant	Cpl.	Hon. Lieut.	Staff-Sergeant.
Light Horse Field Ambulance ..	—	2	—	—	2
Field Ambulance ..	—	3	—	—	3
Casualty Clearing Hospital	—	1	1	1	1
Stationary Hospital ..	—	1	1	1	1
General Hospital, 520 beds	—	2	—	1	1
General Hospital, 1,040 beds	1	1	—	1	2
Ambulance Train ..	—	1	—	—	1
Hospital Ship	—	1	1	—	2
Advanced Depot of Medical Stores ..	—	1	—	—	1
Base Depot of Medical Stores	1 ⁴⁰	1	—	1	1

⁴⁸ Col A. E. Shepherd The Director-General, Surg.-Gen. Fetherston, was at this time abroad.

⁴⁰ Home Service. Some 20 pharmacists were commissioned in the A.I.F.

For the Reserve in Australia the establishment was to be:

District.				Hon. Captain.	Hon. Lieutenant.
1st Military District	..	..		I	8
2nd " "	..	..		I	15
3rd " "	..	..		I	15
4th " "	..	..		I	8
5th " "	..	..		I	5
6th " "	..	..		I	5
Totals	..	..		6	56

The order was carried out in Australia, but in the A.I.F. was subject to a curious, and to the Pharmaceutical Service, intensely irritating policy of obstruction on the part of the D.M.S., Surgeon-General Howse. The course of events is shown in the following correspondence:

14.11.16 Fetherston to Howse. "I would like you sometime to let me know if you have any general rule governing the use of dispensers, i.e. qualified chemists who are acting as dispensers, as to their rank. Here we give them the rank of Staff-Sergeant as a matter of course. The chemists generally have been extremely good and helpful to us in Australia. We have had no trouble whatever with them. They have been extremely loyal, and I therefore want to do any little thing I can for them. They are not always writing and trying to get advancement for their men like some other branches."

Again on 3.3.17: "With regard to chemists. If everybody was as loyal to me as the chemists have been, the medical officers' show would have been an easy one to work. . . . Long before the war there was the A.A.M.C. (Reserve, Pharmaceutical) in Australia, in which a great many of the chemists had commissions, so that commissioned chemists are nothing new. I am sure you will find them the same as I have."

30.4.17 Fetherston to C.G.S. and Secretary. "*Hon. Lieut. Pharmacists in A.M.C., A.I.F.* The D.M.S., A.I.F. evidently has not recommended Pharmacists for promotion to the rank of Hon. Lieut., in units under his charge. I have written several times on the subject to D.M.S., A.I.F. without result."

"It is suggested that the following letter be sent by the Secretary in next despatch to G.O.C., A.I.F., London:

"'Complaints have from time to time been received that Pharmacists in A.I.F. do not get the promotion to which they consider they are entitled. A report is desired regarding the position of Pharmacists in the A.I.F. Hospitals and other units overseas. A.M.C., A.I.F. War Establishments authorise the granting of a commission with rank of Hon. Lieut. to one Pharmacist in each Stationary or General Hospital, and which will be embodied in next issue of the War Establishments of the Australian Military Forces.'"

26.17. Defence to A.I.F. Headquarters, London. "Following my

telegram WY697 10th May relative Pharmacists in A.I.F. (Stop) Minister approves one Pharmacist with rank Honorary Lieutenant be allotted following A.I.F. Medical Establishments overseas: General Hospitals, Stationary Hospitals and, in cases where number of beds is 400 or over, for Infectious Diseases Hospitals, Dermatological Hospitals, Auxiliary Hospitals, and Casualty Clearing Stations (Stop) Please take action accordingly and report."

The dispute between Howse and the pharmacists further centred in the command of the A.I.F.'s Base Depot of Medical Stores. Throughout its immense development it was never at any time placed under the command of a qualified pharmacist. The following list of Commanding Officers is compiled from the records of the unit.⁵⁰

The "improvised" depot formed in 1914 at Mena was placed in charge of Capt. A. J. Aspinall. When this nucleus was transferred to No. 1 A.G.H. at Heliopolis the Director of Medical Services, A.I.F. (Surgeon-General Williams) placed Major M. B. Johnson, A.A.M.C. in charge, his appointment dating from 29th March 1915. On 5th September 1915 Major A. L. Buchanan, A.A.M.C. took over from this officer and remained in command until the transfer of the unit to England in August 1916 when he was appointed D.A.D.M.S., A.I.F. Depots in U.K.

The duty of maintaining the records of the office had been carried out since March 1915 by Private (later Staff-Sergeant) C. S. Price. In March 1916 this officer was promoted "Honorary Lieutenant and Quartermaster" and acted in a more or less informal capacity in command until March 1917 when he was made Honorary Captain and appointed to full command. He relinquished the position on 28 February 1919 and was succeeded by the chief clerk to the D.M.S. Honorary Captain and Quartermaster J. Drummond.

Captain Price was a business man who had enlisted as an orderly in the A.A.M.C. He had no training in pharmacy but acquired in the course of his duty an extensive knowledge of medical stores of all kinds. The question of appointing a pharmacist to command was raised first by Major Cossar on his tour of inspection, and subsequently General Fetherston

⁵⁰ The staff controlled by the officer in command of the depot in 1918 consisted of the following: 1 quartermaster in charge.

Medical Sub-Depot.—1 honorary lieutenant and pharmacist, 2 staff sergeant dispensers (1 for dispensing duties, 1 for manufacturing duties), 1 sergeant clerk, 1 sergeant, general duties, 1 corporal, instruments, 1 corporal, drugs, 1 corporal, sundries, 1 corporal, packing, 10 privates.

Dental Sub-Depot.—1 dental officer (lieutenant), 1 staff sergeant, 1 corporal clerk, 4 privates

The duties of these officers were defined as follows by the D.M.S., A.I.F.
"The Quartermaster in charge will be directly under my supervision and will be responsible to me for the purchase and disposal of medical stores. The Honorary Lieutenant and Pharmacist will, in addition to his duty at the Base Depot Stores, act on my staff as adviser in matters affecting purchase and manufacture of drugs."

took it up with Howse, and also wrote direct to General Birdwood as follows:

The policy of the Defence Department is that all such stores shall be in charge of Pharmacists and that the dental supplies (many of such articles required are the same as used by medical men) shall be a branch of these base stores under a person experienced in Dental supplies, not necessarily a dental officer.

In my opinion, the recommendation, if carried into effect, will increase the efficiency and at the same time reduce the cost of managing these Stores. I am aware that there is a qualified Pharmacist employed in each Store but it is quite a different matter to place a professional man under an officer with no professional training and only a superficial knowledge, than to give the professional officer charge, as when in charge, there will be far more opportunity and encouragement for the exercise of zeal and accuracy of a professional nature.

I shall be pleased if you will consider this matter and can see your way to bring these Stores into line with those in Australia and into line with the policy of the Defence Department.

Commenting on this letter, when forwarded to him for remark, General Howse wrote to Birdwood that the store comprised two sections, medical and dental. He continued:

Capt. C. S. Price appointed Hon. Lieut. and Q.M. of this Depot on 1.3.16, acting C.O. on 31.8.16, has been in command since 31.3.17 and has efficiently carried out the duties of advisor in the purchasing of medical and dental stores to the value of many thousands of pounds annually. I do not know of any other officer in the A.A.M.C. who possesses the necessary knowledge to efficiently and economically carry out the duties.

As the unit is at present constituted, it would be impossible to place it under the command of either a Dental or Pharmaceutical officer.

Defence was accordingly informed that it was not considered advisable to make any change in the command of the store. Yet it cannot be denied that the Pharmaceutical Service had good cause for complaint in this matter. It may be suggested that the depot which in 1915, following British precedent, was put under a medical officer, might with propriety have continued under medical command. But it is undoubtedly true that Surgeon-General Howse's policy of placing the general control with a non-professional officer had precedent in Australian and British Army tradition.

The lieutenant-pharmacist provided for in the depot establishment was responsible for

the internal administration of the depot, comprising supervision of

the compounding, the issue to transports and units and the custody of the bonded stocks.

In 1917-18 the position was held by Honorary Lieutenant G. T. Say. He was succeeded at the end of 1918 by Honorary Lieutenant W. F. Roff. The effective strength of the staff in 1919 was 30 rising to 50 in the middle of the year. In his final report to the D.M.S. Captain Drummond makes the following comment:

"Of the work and loyalty of the staff in general . . . I cannot speak too highly. But for the cheerful cooperation of all ranks it would not have been possible to cope with the heavy and constant transport demands, nor to state, as now, that on no occasion during the year were the operations of the Movements and Quarterings Branch [of Repatriation] hampered by delay in the supply of medical stores to the outgoing transports."

It is fair to add—"without prejudice" to the professional issues involved—that no officers in the Australian Service performed their duties more efficiently than did Captain Price and Captain Drummond.

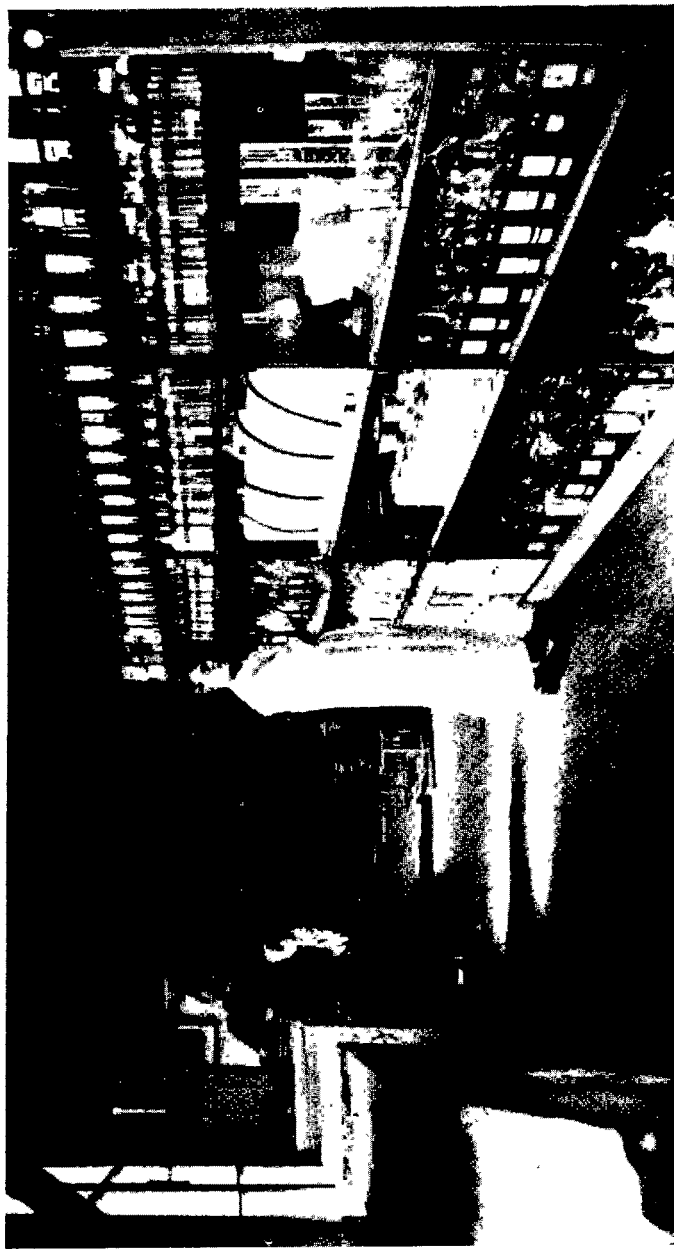
The professional work of the members of the Pharmaceutical Service in this war, and not less their personal service as an element in the Australian Army Medical Corps, was, in common consent of commanding officers, of a high order. The nature of their field work has been indicated in the narrative volumes. As the war progressed and warfare became, in effect, the normal social *milieu*, the work of the medical service came to approach in complexity and specialisation that of the medical profession in peace; and this increased the necessity for a scientific "division of labour". At the end of the war this technical evolution was bringing new requirements, *e.g.*, in the care and dispensing of biological products and of labile chemicals. It may perhaps be prophesied that it is along these lines that the Pharmaceutical Service of the Army will achieve its proper place in scientific warfare.

The moral complex and social self-regard of the pharmaceutical profession, and therein of the Army Service of Pharmacy, may find legitimate uplift and incentive in words used by one of the most philosophic minds in British medicine, Mr.

Wilfred Trotter, in addressing the Guild of Public Pharmacists on 18th January 1933.⁵¹

Up to the present time medicine has almost wholly avoided the burden of measurement. Its field is so rich and various that qualitative methods of inquiry have proved at least adequate. Signs, however, are beginning to be perceptible that perhaps the main harvest of those methods has been gathered. If these omens are fulfilled, a time will come when an exact and exhaustive numerical exploration of the facts of disease will have to be undertaken. . . . The only branch of medicine which has always, and with increasing intentness and success, pursued the ideal of exact measurement is pharmacy. I do not think there can be any reasonable doubt that the future of the parent subject to a large extent depends on how far she is able to adopt the characteristic method of her daughter.

⁵¹ *The Collected Papers of Wilfred Trotter, F.R.S., pp. 141-2.*



17. DISPENSARY OF NO 1 AUSTRALIAN GENERAL HOSPITAL AT ROUEN, FRANCE, SEPTEMBER 1918

Aust War Memorial Official Photo No E3425

To face p 526.



18. SOME NOTABILITIES OF THE AUSTRALIAN ARMY NURSING SERVICE

Centre Miss E. A. Conyers, Matron-in-Chief A.A.N.S. from 1916; *top left* Miss G. M. Wilson, Matron of No. 3 A.G.H. and Deputy Matron-in-Chief; *top right* Mrs. J. McHardie White, Principal Matron in charge of Australian nurses at Salonica; *bottom left* Miss E. J. Gould, original Principal Matron in the A.A.N.S.; *bottom right* Miss Jane Bell, original Principal Matron in the A.A.N.S.

CHAPTER XI

THE AUSTRALIAN ARMY NURSING SERVICE¹

At the beginning of the war and until the middle of 1915 the sphere of action of Queen Alexandra's Imperial Military Nursing Service was confined as also was that of the Australian Army Nursing Service to that of the general hospitals at the base of operations; expressed in terms of *time* after wounding the nurse's intervention did not begin, as a rule, until after the initial stages of treatment had been carried out. By the end of the war, in the British Army and the Australian force² the female nurse had become an almost essential, certainly an extraordinarily important, element in the whole scheme of "evacuation"; her assistance was relied upon from the first major therapeutic intervention in the field—that is, at the casualty clearing station—throughout the course of treatment, until the soldier's discharge from the Army. And after his discharge, in the difficult and poignant history of "the aftermath" the permanently injured or sick soldier was even more dependent on female nursing ministrations and care, and the medical profession on the nurse's co-operation.

This account of the nursing service does not attempt to cover the varied experiences and adventures of Australian nurses in the First World War; for that the reader is referred to several excellent books by nurses, some of which are referred to in the following pages. The task of the present writer is, necessarily, to give a general picture of the participation of the nursing profession in the war and the administration which made this possible.

¹ In the narrative chapters of the first volume a statement is made of the circumstances that led to the formation of an Australian Army Nursing Service, and of the conditions of service in it and place of the service in the Australian military system before the war. There and in *Vol. II* a brief account is also given of the creation of a nursing service for the A.I.F. and of some of the experiences of its members. Many narratives by members of the A.A.N.S. are in the Australian War Memorial in Canberra; some are quoted in this chapter and, had space allowed, the writer would have wished to draw on them much more fully.

² In the French and German Armies female nurses were much less employed in the forward zone—in the Russian, it would appear, scarcely at all.

THE HISTORICAL BACKGROUND

The female Army Nursing Service as found in the British and the Australian Armies is to be regarded as an offshoot from the civil profession of sick nursing, rather than as an original development of the military medical system or offshoot from organised religion. Even in those National Armies which included an "established" female nursing service, the members of that service, legally speaking, were civilians, "attached" to the Army for special duties, and not soldiers—as were, in 1914, the members of the Army Medical Services. The medical service, even by 1914, was a necessary element in the army; the nursing service was essentially a service of humanity.³

**The evolution
of civil and
military nursing**

An unequivocal recognition of the fact that the Army Nursing Service is first "Nursing" and only secondarily "Army" is necessary to a proper appreciation of the significance and the future of the service.

The modern profession of sick-nursing evolved along two independent lines—as a religious, altruistic, humane calling; and as a civil occupation and means of livelihood; and these two impulses to service still operate in maintaining the supply of women to the profession in both army and civil life.⁴ Each produced its social group—of devotees and employees respectively—the former at first incomparably the more important as an element in the social structure. Both, however, were imperfect—the latter indeed, deplorable—until the emancipation of man by science and of woman by democracy opened the way to an integration of these two elements as a "profession".

Before the Renaissances of the 15th and 16th centuries, the nursing of the sick in peace and of the wounded in war was a function chiefly of religious or semi-religious orders, male and female. In war it was mostly left to chance. The Renaissance freed medicine from the dead hand of dogma, but the fruits of

³ The late Maj.-Gen. Sir Neville Howse, sometime D.M.S., A.I.F. stated to the writer his opinion that the (female) Army Nursing Service as a substitute for trained male nursing orderlies does little toward the actual saving of life in war, though it may promote more rapid and complete recovery. He held that its purpose was chiefly one of humane alleviation and support, physical and moral, to the sick and wounded. It should be added that he presumed the existence of a *fully trained service of male hospital orderlies*.

⁴ The relative significance of these two still varies in different countries, being determined chiefly by their religious and social outlook and history.

this freedom were long withheld from the sick nurse. In countries where the "Catholic" outlook in organised religion secured the retention of special orders devoted to this duty, the nursing of the sick poor in peace and to some extent also of the wounded in war, remained a religious or semi-religious calling, as witness the nursing system founded in the 17th century by St. Vincent de Paul. But it was not till 1840 that the first Protestant training school for nurses was founded by the Lutheran Pastor Flidner—the world famous Kaiserwerth Deaconess Institute at Innsbruck in Germany. In the same year, on the initiative of the great social reformer, Elizabeth Fry, an "Institute of Nursing Sisters" was formed in London on the lines of the Deaconess Institute. In 1843 certain Anglican sisterhoods were established in London, and for a time (on a minor scale) filled the place occupied on the Continent by the sisterhoods of the Roman Catholic Church.

In 1854 came the Crimean War; and Florence Nightingale, inspired by professional enthusiasm, not less than by practical devotion, attempted to combine the two prime incentives to nursing service—religion and livelihood—retaining from the one its devotion and discipline, and from the other its freedom. But her greatest achievement was to endow the service with a *scientific technique*. In all British communities the social service of nursing, civil and military, dates from her. The spark that fired the train was the departure to the Crimea⁵ of this insatiable devotee of science and religion with her assorted team of women, trained and semi-trained, drawn from every class of society, and from both religious institutions and civil occupations. The success of this extraordinary experiment was based on years of exact thought and study; its continuance has been due to the employment in schools of training and elsewhere, against great and prolonged opposition, of women imbued with the principles laid down by the foundress and pursued with devotion, discipline, and the aid of the new enlightened education.

⁵ It is not generally known that even in the British Army the use of female nurses was not unknown before Crimea. Prof. G. E. Gask (the celebrated British surgeon, who was *persona grata* with the Australian Medical Service) has brought to light record of the attachment of female nurses to hospitals in Portugal which served the British Expeditionary Force to Belleisle (1762), to which John Hunter acted as chief surgeon. According to Prof. Gask (Royal College of Surgeons lecture 15 Feb. 1937), they were also used in the wars in Ireland in the reign of William and Mary. And in his *Short History of Surgery*, Sir D'Arcy Power takes up the cudgels strongly on behalf of the pre-Nightingale nurse.

From the close of the Crimean War the history of sick nursing is one of education of every part of the community to new ideas as to the status and capacity of woman. A trained female nursing staff was attached to the British Standing Army in 1856. In 1860 the Florence Nightingale Memorial Training School was established at St. Thomas's Hospital, in London. The civil nursing profession and military nursing service grew side by side, and from them the Australian nursing system, civil and military, derived.

The Crimean War ended in 1855. In 1856 the old military hospitals at Fort Pitt, Chatham and the new one at Netley, were staffed with trained nurses under a "Lady Superintendent". These women had full control of the wards and the male non-commissioned staff took instructions from them. For a time these hospitals served as training schools for Army nurses but ultimately only trained nurses from accepted schools were employed. In 1881 an "Army Nursing Service" was formed; and in 1883 it was laid down that every military hospital of over 100 beds should have a staff of Army Nursing Sisters. In the Zulu War of 1879 and again in the Sudan Campaign of 1885 (for which New South Wales supplied a medical contingent) the experiment was tried of sending Army Sisters with an Expeditionary Force. The regular nurses serving in the South African War comprised 1 lady superintendent, 19 superintendent sisters and 68 sisters. This number was wholly inadequate to meet the needs of that "hectic" war, even when supplemented by a small Australian contingent and an "Army Nursing Reserve" created in 1898 on the initiative of (and named after) H.R.H. Princess Christian. Incidentally, it was on the principle of this Reserve that the Australian Army Nursing Service, presently to be described, was based. The influence of the South African War has been described as follows:

As the Crimean War led to the employment of nurses in military hospitals and the eventual inauguration of the Army Nursing Service, so the South African War . . . led to the reorganisation of the Army Nursing Service and the formation of the Queen Alexandra's Imperial Military Nursing Service (the "Q.A.I.M.N.S.").

After that war the service was implemented by the creation of the position of a "Matron-in-Chief" on the staff of the Director-General of Medical Services at the War Office, controlling

principal matrons, matrons, sisters and staff nurses. The Army Nursing Reserve was extended; and in addition—to complete the organisation of the Territorial Force created by Lord Haldane—there was formed a Territorial Army Nursing Service. Various offshoots from the original service have from time to time been formed; at the outbreak of the First World War the strength of the service was 290, of the reserve 800, of the Territorial Force Nursing Service 2,576 and of its reserve 713.⁶

The regular service was at once increased by enlistment of personnel from the reserve and from the civil profession in Britain and dominions who were enlisted in the Q.A.I.M.N.S. and designated "T" (Temporary). Of the whole British nursing service 11,431 were sent abroad including 2,812 V.A.D. nurses. From the outbreak of war the Matron-in-Chief at the War Office was Miss E. H. Becher; in 1914 Miss Maud McCarthy (who received her first training in nursing at the Coast Hospital, Sydney) was appointed Matron-in-Chief to the B.E.F. with office at Abbeville, the Headquarters of the Inspector-General of Communications.

NURSING IN AUSTRALIA

The history of general sick nursing in Australia may be summarised as comprising three stages:

The evolution of nursing in Australia 1. The development of a system of trained nursing in connection with the various metropolitan "General" Hospitals, which at first were military or semi-military.⁷ This system was individual to the hospitals concerned and the duration and standard of training differed widely.

⁶ It is of considerable interest that at this time every Japanese nurse trained in the great public hospitals received her certificate of competence on the express condition that for 15 years she was liable to serve with the army if called on.

⁷ The first nursing sisters to arrive in Australia were French members of a religious order. After working for a time in Parramatta they established themselves in Sydney in 1857 where they founded the nucleus of a social service from which evolved St. Vincent's Hospital—and in succession the great hospital system of the Roman Catholic Church in Australia. In time this became integrated with (though not absorbed in) the national system of trained nursing in Australia.

The first organised and official nursing system in Australia was military, and developed in connection with the Sydney Hospital, created to meet the needs of the military force—the chief element in the community, apart from the convicts. The following facts are drawn from Dr. F. Watson's interesting *History of the Sydney Hospital*.

"Picture to yourselves", writes Miss Stella Pines (*Melbourne Herald*, 11 May 1933), "the conditions at this time. There were tents with four grass beds, and one blanket among four patients, the strongest of whom always managed to secure the blanket for himself. There were only convict nurses.

2. The self-organisation of their profession by the nurses themselves, and establishment of a standard of training and ability by voluntary registration and examination. This was carried out by the medium of the two great associations, of which the Australasian Trained Nurses' Association originated in New South Wales and the Royal Victorian Trained Nurses' Association in Victoria. The two joined hands in 1933 in the Australian Nursing Federation. These bodies were remarkable in the fact that they were formed for self-discipline, as well as for professional advantage, since they included in their purpose the protection of the community from exploitation by the *untrained* nurse, as well as the protection of the nurse from exploitation by the community.

Surgeon-General Fetherston in a report sent to the War Office at the end of 1916 said:

Training of Nurses in Australia. The training of Nurses in Australia is controlled by two affiliated Nursing Associations, *viz.*, the Australasian Trained Nurses Association, and the Royal Victorian Trained Nurses Association.

These Associations keep a register of all Trained Nurses in each State. They direct the course of training to be followed. Register all Training Schools, and Nursing Homes. They conduct the final examinations, issue certificates of competency, and generally direct Nursing affairs in Australia. Nurses who are not members of one of these associations cannot obtain any benefit from either or from their registered Homes. Both are voluntary associations but such is their strength and power that practically all Trained Nurses have to become members.

Training Schools. All Training Schools before being recognised as such must comply with the conditions imposed by these associations, must be properly equipped and have a competent Staff of Teachers. Should they fail to keep up to the necessary standard their registration is cancelled.

In no case is a course of less than three years training accepted as

"It was in the 'sixties that the need for improving the nursing staff was realised, and Sir Henry Parkes, at that time Colonial Secretary, wrote to Florence Nightingale to enlist her sympathy, and help establish a training school.

"On October 24, 1866, she approved the scheme, and in December, 1867, a Lady Superintendent and five sisters sailed for Australia. They arrived in March, 1868. Miss Lucy Osburn was the Lady Superintendent, she was addressed as 'Mam' by the nurses, and to others was known as 'The Lady'. It was one of these sisters who came to Melbourne to take charge of the Melbourne Hospital."

The Melbourne Hospital had been no less primitive in its beginnings. In 1848 (four years after the establishment of a teaching school) the Matron was the only woman on the premises, and had been given the job mainly because the wardman had been drowned, in tragic circumstances. The male patients were looked after by the apothecary.

The further evolution of nursing as a "closed" profession or occupation followed closely the lines already described of the dental and pharmaceutical professions.

qualifying for admission to the final examination and in case of the smaller Hospitals four years and in some cases five years training is necessary before graduation. The course of study is full and complete, beginning with an educational qualification prior to entering Training.

Examination. The standard set is high and the final examination is a stringent one.

3. A further stage, gradually reached in most States during and after the war, has been that of State registration; and, subsequently, the making of an arbitration court award giving certain improvements—demanded by the public conscience, in matters of pay, hours of work, annual leave, and so forth.

Thus by 1914 in every State the training of nurses was exactly organised and the standard rigidly controlled. By any comparison its scientific and practical standard was as high as any in the world;⁸ its professional organisation was probably superior.

The Army Nursing Service in Australia owed its origin to the great organiser and administrator whose part in the building of the structure and traditions of the Aus-

**The Australian
Army Nursing
Service**

tralian Medical Service were described in *Volume I*—Colonel W. D. C. Williams, A.A.M.C.⁹

In May of 1899, two years before Federation, in the Colony of New South Wales twenty-six nurses were enrolled to initiate the "Army Nursing Service of New South Wales". The first Lady Superintendent, Miss E. J. Gould, writes:

In February 1899 Colonel Williams asked me to help form a Nursing Service in connection with his Army Medical Corps Service. In May of same year, when the various branches were receiving the training necessary to make them militarily efficient, the little band of 26 Nurses were "*sworn in*"—one Lady Superintendent, one Matron and twenty-four

⁸ The period of training was made proportionate to the number of beds in the hospital, with a fixed minimum of beds and a minimum period of training of three years. Training of "probationers" was carried out (1) by the senior nursing staff of the hospital, (2) the medical staff, through a system of "probationary" service in hospital with practical instruction and lectures. It was controlled by periodical examinations and registration by the Nursing Association (and where in force, the State) was conditional on satisfactory reports and the passing of a final and very strict test, practical and theoretical. Unfortunately (and the fact calls for strong criticism), the English nursing authorities had refused to accept Australian credentials, and in general maintained an attitude of aloofness. The awakening of at least the military nursing profession in Great Britain to the qualifications—and the qualities—of the Australian nurse provides an interesting study in social and national relations.

⁹ Later Surgeon-General, first Director-General of Medical Services, A.M.F.; first Director of Medical Services, A.I.F. (*See Vol. I, Chap. 1*)

Sisters.¹⁰ Colonel Roth and Colonel Vandeleur Kelly succeeded in convincing us that only in the Army would you find a nursing field where everything ran on "greased wheels" from the firing line, back through the various collection stations, stationary hospitals and base hospital. More greased still the Army Service Corps. Our place in this magic organisation was clearly defined and, twenty years later, the Australian Army Sister still reaps the benefit of those preliminary instructions for the nursing spirit of the New South Wales section (of which alone I can speak with authority) has always kept in time with the rest of the Corps and worked harmoniously with the medical officers, orderlies, and others.

A special uniform was authorised. Membership of the service imposed the obligation of achieving and maintaining "efficiency" by attending a course of instruction in military organisation. Of the experience of a small contingent of these nurses in the South African War the following interesting summary has been obtained:

In January 1900, 12 "efficient" sisters with a "Lady Superintendent" (Miss Gould) accompanied the second (N.S.W.) contingent to South Africa. These trained Australian women served as part of the British Army throughout this war—the first in which trained female nurses played an important part in the medical strategy of warfare. The demand for nursing service in this war became very great—met by a very promiscuous staff of civilian trained nurses and untrained "Red Cross" amateurs. The experience of the Australian sisters had an interest that carries forward to the Great War. Miss Gould says:

"We commenced duty at a Stationary Hospital at Sterkstroom near Stormberg. Here we nursed those sick and wounded from General Gatacre's Division around Stormberg. . . . A short stay of three months, after which we went on to Cronstadt. Here we nursed in No. 3 British General. . . . Three months later, we were transferred to No. 6 General British Hospital in Johannesburg. Our reception here was curious. On handing in my papers to the P.M.O. he groaned 'my God, Australian Sisters, what shall we do'. On my asking the reason, he said, they did require help, but he understood we could not work with the R.A.M.C. Sisters. Upon my assuring him that we not only could but would with pleasure, he sent for the Superintendent Sister, Miss Oram. Miss Oram was, to my mind then, exceptional, and she has never come off that pedestal (*See Vol. 1, p. 199n*). . . . We stayed 18 months here and never once felt we were not wanted, for there were only 35 Sisters for the 1,200; 14 hours duty was the minimum. When No. 6 closed down, we went to Ermelo in the Eastern Transvaal to No. 35 Stationary, on a bare hillside at the end of sixty miles of Blockhouses. Here we saw the start of seven columns which took part in the last drive of the war and

¹⁰ Miss Gould adds—"This swearing in brought us under the Queen's Regulations and was never changed for our Unit. Later staffs, however, were not sworn in—merely filled in forms." The two officers mentioned are seen in the illustration on p. 6 of *Vol. I*.

here we saw the Boers come in to surrender arms. No bitterness on either side."¹¹

In 1902 when an Australian Defence Force was organised the "Australian Army Nursing Service Reserve" was modelled on that of New South Wales.¹² It was to be **The A.A.N.S.** considered "a volunteer portion of the Medical Services of the Commonwealth" and its members would be liable to be "called up for duty in case of war or any national emergency".¹³ During the twelve years before the Great War the service was effectively "constituted", the "voluntary establishment" in each State being fairly maintained and a voluntary reserve built up of "efficients" and "non-efficients".

The organisation of the service, and its status and purpose in the Army, have not been subject to any material changes since its initiation.

Comparing the Australian organisation with the British Miss Grace Wilson, Principal Matron and Acting Matron-in-Chief, First A.I.F., says:

The great difference was the existence (in the British Service) of a permanent nucleus, the Q.A.I.M.N.S., thoroughly trained in military administration, and with a knowledge of the routine returns required by the Army Departments; whose status, and place in the military organisation was well established and known within the medical service, and which was capable of rapid expansion.

The A.A.N.S. of the Commonwealth had practically no peace training and had no pay—not even expenses. On the other hand the professional opportunities in the Q.A.I.M.N.S. were certainly not greater than those of civil life. . . .

Another matter in which the A.A.N.S. had everything to learn concerned the male "nursing orderlies". The Q.A.I.M.N.S. was trained as part of a system in which the R.A.M.C. orderly went through a course little less strict than that served by a trained nurse.

Thus while it can be stated without hesitation that the general standard of nursing in the A.A.N.S. was certainly not lower than in the

¹¹ It is of interest to recall that in 1917-18 at Abbeville the South African Stationary Hospital was neighbour to No. 3 A.G.H. and that a welcome visitor to the Australian Hospital was Capt. Joubert, S.A.M.C., a nephew of Gen. Piet Joubert, the celebrated Boer leader.

¹² See Vol. I, Chap. i.

¹³ Before Federation the members of the service were "classified" as "Lady Superintendent", "Matron", and "Nursing Sister", who when called up for duty would be paid at the rates of £100, £60 and £40 respectively. The Military Orders constituting the Commonwealth Service laid down that "a regulation uniform similar to that of the Army Nursing Service (i.e. the British Service) will be worn upon military duty, for which a capitation allowance of £1 p.a. will be granted to each 'efficient' when duly provided on the Military estimates." A "badge" was issued "to be worn at all times with the uniform". The title Lady Superintendent was changed to "Principal Matron".

British Nursing Service, it is equally certain that in military administration we have much to learn.

EXPANSION OF THE A.A.N.S. 1914-15

On the outbreak of war, when the Australian home forces were partly mobilised for home defence, the small Australian

The outbreak of the War: Army nursing organisation was warned for home service. In New South Wales, says Miss Gould, Principal Matron:¹⁴
Australia 1914-15

As soon as war broke out we sent out notices to all Efficient and Reserve Sisters asking them whether in the event of the Nursing Service being required they were prepared for (a) Home Service (b) Overseas Service. That year Efficients, as was always understood, were to have first chance. By the second week in September arrangements were almost complete and in addition to the Efficient Sisters and Reserve Efficient Sisters, more than a hundred fully qualified members of the Australasian Trained Nurses' Association were eagerly awaiting enrolment.

Occasion did not at the time arise for the general employment of the reserve as such. But with very few exceptions the members of the reserve at once volunteered for service abroad in the A.I.F., as did also, in every State, from the outset of the war, large numbers of the general nursing profession. For a time preference for positions in the A.I.F. was given to members of the reserve and from it were selected the principal matrons, matrons, and most of the sisters that left Australia early in the war.

In Australia itself, within a little over six months,¹⁵ general, stationary and convalescent hospitals had been established in each of the six States—a total of over 5,000
In Australia beds—for the treatment both of the sick from camps of training and of returning "invalids" from the A.I.F. Of these, by the end of 1915, 7,536 had been sent home, and by the end of June 1916, another 6,230 (1,809 wounded and 5,421 sick), a large proportion of them requiring hospital treatment for longer or shorter periods. The medical personnel necessary for this home service included over 500 members of the nursing profession. By the end of 1916 the transfer of the infantry to Europe and the adherence to the "six months' policy" (whereby

¹⁴ See also Vol I Miss Gould died in 1941 at the age of 81. She was full of interest in affairs till the time of her death and provided a useful narrative for the history.

¹⁵ See Vol I, Chap XXVI.

every convalescent sick or wounded man "unlikely to be fit for duty within six months" was sent home to Australia) created extensive problems of after treatment and care, and increasing demand for "home service" personnel, of which female nurses constituted the largest proportion.¹⁶

The resolution that trained female nurses should accompany the A.I.F. was determined directly by the request of the British

The A.I.F. War Office that Australia should raise certain Line of Communication medical units.¹⁷ British Army "war establishment" for General Hospitals provided for the inclusion, in some circumstances, of a proportion of female nurses;¹⁸ and in view of the fact that in Australia, apart from mental nurses, there was no body of trained male nurses to draw upon as "nursing orderlies" in the hospitals, the proportion of the female nursing staff was much increased in the Australian General Hospitals. In the first year of the war these nurses proved so convincingly the ability of women to fulfil all the requirements of trained nursing in war that, within limits noted later, the policy was maintained throughout.

From the outset, it was found necessary to draw heavily on the general nursing profession for enrolment of trained nurses to accompany the Australian Imperial Force. There at once arose questions of status, duties, rank, seniority, and so forth. No Commonwealth "seniority" list existed; the status of the existing service was obscure; its military training was sketchy. It was essentially a Militia Reserve—not, like the Q.A.I.M.N.S., a professional military nucleus trained in Army methods.

The Australian Nursing Service was not at first even represented on the staff of the Director-General at Defence Headquarters in Melbourne. As in much else, the Director-General was compelled to create precedents. He was guided in this by the organisation and methods of the British (Regular) Nursing Service and by the general policy laid down for the A.I.F.

The nursing personnel sent overseas with the first hospitals

¹⁶ For an account of this see *Chap xv*.

¹⁷ See *Vol. I, Chap ii*.

¹⁸ British hospitals at the actual seat of war did not always include female nurses. Thus it will be recalled that Nos. 16 and 17 British General Hospitals, sent out for the Gallipoli Campaign, were staffed entirely by men, who were replaced for a time by members of the A.A.N.S.

organised in response to the British request comprised the staffs for two General Hospitals (Nos. 1 and 2) of 520 beds, and, as already noted, nurses were allotted much in excess of British war establishments. The hospitals were sent later than the first contingent of the A.I.F. but a batch of the nurses was sent in advance, carrying out duty on the troop transports of the first convoy.¹⁹

In May 1915 No. 3 and in August 1916 No. 14 Australian General Hospitals each of 1,040 beds were sent overseas.²⁰ Each was organised and staffed for a normal reception of patients almost twice—and in expansion three or four times—as great as that of most large public hospitals. On 3rd October 1915 there had reached England No. 10 General Hospital which was to have been completed in England but was broken up there. It brought 58 nurses who went to Epsom, Wandsworth, and other British hospitals. Nos. 1 and 2 General started each with over 90 nurses and No. 3 with 80.²¹ Matrons and sisters of the pre-existing A.A.N.S. took precedence in accordance with their rank and seniority in the service. With those who had not been members of the service in peace-time the procedure was to rank them in the order of their enlistment in the several States, allowing three each from New South Wales and Victoria, two from Queensland and South Australia, one each from Western Australia and Tasmania. In all later enlistments this course was adopted.

The purpose in this first enrolment of female nurses was specifically to promote the treatment of Australian soldiers in A.I.F. hospitals. But as a general policy this purpose was soon

¹⁹ The D.M.S., A.I.F. urged this step "in view of the length of the voyage to England". It may be noted here that, on being disembarked in Egypt, these nurses were for a time employed under a British matron, Miss Grierson, in the New Zealand Stationary Hospital. When they rejoined their units this matron sent an almost enthusiastic report of their work to the Australian Director.

²⁰ The circumstances of the raising and staffing of these vast units has been described in *Vol. I*, pp. 88-9, 649.

²¹ The staffs of these units were raised as follows: Sisters from Nos. 1, 3, 5 Military Districts to No. 1 General Hospital, and those from Nos. 2, 4, 6 Military Districts to No. 2 General Hospital.

The two Principal Matrons were Miss Ellen Gould, from New South Wales, No. 2 A.G.H., and Miss Jane Bell, from Victoria, No. 1 A.G.H. The Matrons were Miss M. Graham, Miss M. Knowles, Miss M. M. Finlay, Miss J. Miles Walker and Mrs. J. McHardie White. The Principal Matron with No. 3 A.G.H. was Miss Grace Wilson.

By special arrangements with the Australian Government 10 trained nurses from New Zealand enlisted in the A.A.N.S. for service overseas and at a later date were included "additional to establishment" in the staff of Nos. 1 and 2 General Hospitals.

found as impracticable as it was undesirable;²² moreover the decision that Australian invalids, not likely to be well in six months, should be nursed in Australia and not oversea robbed the nursing service abroad of a great part of its work. Members of the Australian nursing profession, eager to serve—especially abroad—began to realise that the chance of doing so with the A.I.F. was limited.

But another avenue opened up, by which eventually more than half of the Australian nurses who entered for service were enabled to do so. This was service with the British forces. At first the opportunity to do so came with an offer from the British War Office (suggested by Surgeon-General Williams) to receive Australian recruits in the Q.A.I.M.N.S.²³ This was accepted and in Australia nurses applying to enrol were, for a time, allotted somewhat high-handedly to both the A.I.F. and Q.A.I.M.N.S. Reserve, 130 in all being sent overseas into the latter service. The cable from the High Commissioner implied that the need in England was "very urgent". Two quotas of nurses—many transferred from candidates for A.I.F. service—were despatched together with the intimation that another 200 were available.

At first these were not desired. But as 1915 wore on the demand for well-trained nurses came to exceed the immediate supply. At the same time opportunities for trained female nursing service in Australia and the A.I.F. were rapidly opening up. Moreover it had become evident that enlistment in the British service entailed, for Australian women, certain disadvantages, and the desire to serve with the A.I.F. was intense and compelling. The result was that when in July 1915, the War Office obtained transmission by the High Commissioner of a cable desiring the services of 100 more Australian nurses—agreeing this time to pay 2nd class fares both ways, and to accept (with certain restriction) Australian qualifications—only some 43 could be found willing to enrol for British service, of whom 29 ultimately were absorbed in the Q.A.I.M.N.S. Reserve.

On 26th July 1916 the War Office through the High Com-

²² See comment by Surg.-Gen. Fetherston, *Vol. I*, p. 395; *Vol. II*, p. 414.

²³ Medical officers for the R.A.M.C. also were asked for. The incident has been described in *Vol. I*, p. 492.

missioner cabled for another 100 fully trained nurses from Australia for Imperial Service—for one year or the termination of the war whichever should happen first. The conditions in respect of status and so forth were an advance on any previous offers.

Nurses “must be guaranteed as thoroughly suitable in every way for employment in military hospital, between the ages of 25 and 45”. They were to be sent if possible on a returning hospital ship—50 for Bombay, 50 for Malta. “If any additional nurses can be spared up to the number of 100 they should be sent to England under the same conditions.” The Australian Government replied making certain conditions and stating that as no hospital ship was available it “proposed to arrange first class passages by mail steamer, 50 for Bombay, 50 for Egypt at the expense of the Imperial Government”.

The D.G.M.S. in Australia, Surgeon-General Fetherston, had now decided that though British needs would be met to the utmost of Australia's ability, it should be under conditions safeguarding the interests of Australian nurses and the autonomy of their service. The request of the War Office was agreed to with the proviso that the nurses *should serve as members of the A.A.N.S.*, retaining their Australian rank and conditions as part of the A.I.F. though available to the British Matron-in-Chief for posting where they might be found most useful.

At this time sea transport problems were very difficult, and on the initiative of the War Office 50 of the surplus nurses in Egypt were sent to Bombay. In August 1916 (on a direct request by the Viceroy of India to the Australian Government) another 100 were sent from Australia to meet the needs of the sick and wounded from the operations in Mesopotamia. At the same time 85 A.A.N.S. nurses were working in British hospitals in England.

In November 1916 at the request of the War Office the D.M.S., A.I.F., Surgeon-General Howse, cabled to the Defence Department

200 nurses urgently required. Can you send 100 equipped for service. Have arranged with War Office that they will be enrolled in A.I.F. and on arrival will be lent to the War Office. A.I.F. will pay them but War Office guarantee repayment of all expenses connected with them if claimed by Commonwealth. First 100 will be employed in France.

A total of 1,479 nurses had at this time been accepted in

Australia for war service, 1,340 had proceeded overseas and 379 were on duty in Australia. The distribution of those still serving was as follows:

Australia	379	A.A.N.S. serving with Im-	
Hospital ships and sea trans-		perial Units—	
port sections	77	In India	150
Transport duty	25	In Europe	127
A.I.F. Europe	459	In Egypt	40
A.I.F. Egypt	73		
Q.A.I.M.N.S.	130		

The next wave of emigrants from Australia to join in nursing the British Army was undoubtedly due to the sense of frustration felt by the nursing profession in Australia at the lack of opportunity for affording feminine ministrations to the sick and wounded of the A.I.F. Its existence was felt by the D.G., Australia, General Fetherston, who on 8th December 1916 presented to his Minister a memorandum on the position in respect to the number that would be available for service with the British if required.

In proportion to the population the percentage of Trained Nurses in Australia is very high and while some 1,700 have been accepted for Service there still remain a large number who are available and are only too anxious to be given an opportunity of serving in the Army Nursing Service either at Home or Overseas.

In addition to the avenues of service already referred to he mentioned the following:

When the first General Hospitals left Australia in December, 1914, 100 Nurses were sent in excess of establishment. With the great expansion of Australian Hospitals and other Medical Units in Egypt to cope with the invaliding from Gallipoli further large numbers of Nurses were sent overseas. With the reduction of A.A.M.C. Medical Units in Egypt, there were many Nurses in excess of the establishments and instead of returning those who were not wanted with A.A.M.C. Units to Australia, they were placed at the disposal of the Imperial Authorities. They have worked in many Imperial Hospitals in Egypt and elsewhere.

Similarly 50 Nurses (sent for No. 10 A.G.H. which was to be formed in England but was ultimately incorporated with another hospital) were distributed in Imperial Hospitals in England; others from the Staff of Hospital Ships and from A.I.F. Transports have been similarly engaged.

The full staffing of military hospitals in Australia required, he said, 340 nurses.

A few Nurses have been appointed for Home Service only. The remainder are waiting their turn to proceed overseas. This ensures a full

supply being always available for Australian Hospitals and it enables the competency and suitability of Nurses to be ascertained before recommendation for A.I.F. This system will be continued. . . .

Number still available. With the object of ascertaining the full number of Trained Nurses available—Advertisements were recently inserted in the public press asking all Trained Nurses who were willing to join the Army Nursing Service to register their names in various Districts. There are now altogether 659 Nurses available over and above the numbers at present required for Staff of the A.M.C. Hospitals and other Units, in Australia.

Future Supply. From 300 to 350 Nurses pass their final examination every year and by graduating become eligible for A.N.S., most of them will be only too anxious to serve in Military Forces.

General Fetherston mentioned that 50 nurses who were married and therefore not eligible for the British or Australian service would be willing to serve "in any capacity" and that "many hundreds" of untrained but healthy and intelligent women could be sent to help the British. The Australian policy was strongly against using untrained women in hospitals. Nevertheless, if the British need for trained nurses was great he was prepared to reverse this policy in order to release more trained nurses to help the British.

This memorandum, which also touched on certain difficulties encountered in the service of Australian nurses with the British, was passed on to the War Office. The statement that "there are now altogether 659 nurses" available for duty outside Australia aroused an immediate response and resulted in the biggest single exodus of nurses in the history of Australian nursing. General Howse records it in a letter to General Birdwood:²⁴

In April 1917 the D.G.M.S. (General Keogh) represented to me that nurses were urgently needed for Salonika and asked me to obtain from Australia the necessary nursing staff for 4 general hospitals at Salonika. In view of the submarine danger in the Mediterranean at the time it was considered necessary to increase the hospital accommodation at Salonika, and it was also considered that nurses could be more safely sent from Australia via Egypt, than from the United Kingdom.

Accordingly the following cable was sent to defence Melbourne:

23.4.17.

"M 7608 Keogh strongly represents the urgent and pressing necessity for more nurses. Of the six hundred and fifty-nine (659) nurses reported to be available in your memorandum 8392 of February 3rd can you send three hundred and sixty-four (364) for duty Salonika, they would form Nursing staff of four General Hospitals. The remaining two hundred

²⁴ Written a year and a half later, 5 Sept. 1918.

and ninety-five (295) less fifty going to India are urgently required for France and England. Do not advise employment on Foreign service of trained nurses who are married."

In consequence of this three units of 91 nurses each embarked from Australia in June 1917, and the fourth unit of 91 on August 31st 1917. The first 3 units took up duty in Salonika in August 1917. The 4th unit after some delay in Egypt, took up duty in Salonika in successive detachments in April, May and June, 1918.

In July 1917 A.I.F. Administrative Headquarters, London, cabled the Defence Department that War Office now had ample supplies of nurses for all hospitals England and France. "Send no more here unless further requested." In August A.I.F. Headquarters again cabled that "in view of difficulties transport D.G., War Office asks for 100 nurses for duty Egypt". To meet this request the Defence Department sent 66 nurses who left Australia in September. The fourth nursing unit for Salonika arrived in Egypt in October 1917. As General Allenby's offensive in Palestine was about to be launched this nursing staff was temporarily detained in Egypt by orders of the D.M.S., E.E.F. and distributed to various British hospitals in Cairo and Alexandria.

In all, the number of Australian nurses who served in the Army during the war was:

	M.I.C.	P.M.	Matron	Sisters	Staff Nurses	Total
Served abroad with A.I.F.	1	5	29	1,131	973	2,139
Served in Aust. only Q.A.I.M.N.S. . . .		2	7	36	378	423
						130

Of 2,229 of the nurses who went abroad the ages were:

Under 21	21-30	31-40	41 and over	Total
7	1,184	947	91	2,229

It was considered that nurses over 40 years were less suited for military service than younger ones. No known married woman²⁵ was allowed to join the A.A.N.S. Those contracting marriage while on service had their appointments terminated and were returned to Australia if they so desired at Commonwealth expense.

²⁵ This did not, of course, include widows.

The distribution of A.I.F. nurses in all theatres of war at the beginning of 1918 (according to the latest returns then available in London) was given by the Matron-in-Chief, Miss E. A. Conyers, as follows:

	Matrons	Sisters	Staff Nurses	Masseuses	Total
<i>France</i>					
No. 1 A.G.H.	1	30	60	—	91
No. 2 A.G.H.	1	30	60	—	91
No. 3 A.G.H.	1	30	60	—	91
No. 25 Gen. Hosp. ..	1	33	66	—	100
No. 5 Staty. Hosp. ..	1	6	13	—	20
No. 35 Staty. Hosp.	1	11	23	—	35
In France mostly employed in C.C.S.'s					59
<i>England</i>					
No. 1 A.A.H.	1	20	36	6	63
No. 2 A.A.H.	1	11	20	2	34
No. 3 A.A.H.	1	20	36	6	63
Weymouth	—	2	9	—	11
Cobham Hall	1	—	—	—	1
Southwell Gardens ..	—	2	2	—	4
Moreton Gardens ..	—	1	1	—	2
St. Albans	1	—	—	—	1
Office	1	1	—	—	2
On duty relieving and still attached to Croydon War Hospital	—	8	53	—	71
			Total		739
Number of nurses detailed on transport duty and invalids awaiting embarkation					26
			Total in France and England		713
Hospital ship and transport	8	25	45		78
Egypt	2	17	230		249
Salonica	3	42	257		302
India					326
			Total		1,668

STATUS OF THE A.A.N.S. 1914-18

A short explanation is here necessary of the conditions under which Australian nurses served in the First World War. A woman could not then in a legal sense be either an "officer" or a "soldier". The nursing service was associated with the military forces under special provisions which permitted the granting of certain military privileges and imposed a degree of military discipline. In time of peace the members of the service were not subject to disciplinary action other than administrative (dismissal from the service), and might resign by giving prescribed notice. In time of war however they might be required to serve in the Commonwealth for the "period of the war" with the military forces; and when "on active service" they were subject to military law under the *Army Act* "as though they were commissioned officers".²⁶

The general conditions of enrolment and service in the A.A.N.S., A.I.F. may be summarised in the following extracts from *Standing Orders, Australian Imperial Force*.²⁷

**Conditions
of enrolment**

68. Australian Army Nursing Service consists of—(a) Matron-in-Chief, (b) Principal Matrons, (c) Matrons, (d) Sisters, (e) Staff Nurses.

69. A candidate for appointment in Australian Army Nursing Service must have had at least three years' training in medical and surgical nursing in a duly recognised hospital, and must be either single or a widow, and between the ages of 20 and 45 years.

70. Any Nurses desiring final termination of appointment in Australian Imperial Force may have same granted on application. . . .

The appointment of any member of the Australian Army Nursing Service who marries will cease from date of marriage. . . .

²⁶ The question whether the members of the Australian Nursing Service with the A.I.F. were "part" of the force was a matter of much debate both at the time and since. The answer must be that it is a matter of terms. Legally the nursing service could not be *part* of the force since its personnel cannot be members of the military forces. "Members of the A.A.N.S. are not enlisted, nor do they take any oath of enlistment within the meaning of the *Defence Act*, and so appointments are made to the Service by the Governor-General. They do not appear therefore, to be members of the Military Forces. . . . The Australian Army Nursing Service is not a part of the *Defence Force*." (Opinion of Commonwealth Crown Solicitor, 1932.) On the other hand the service takes precedence as such in the Australian Military Forces in the same manner as the Q.A.I.M.N.S. in the British Regular Army.

In respect of the Australian members of the Q.A.I.M.N.S. the Repatriation Commission has ruled as follows: "The Defence Department having advised that Queen Alexandra's Imperial Nursing Service (*sic*) is a part of the Army Nursing Service of the United Kingdom the Commission has ruled that Australian members are eligible under the Repatriation Act (if qualified by residence in Australia)."

²⁷ Issued with *Military Order No. 50 of 1918*.

71. Members of the Army Nursing Service and Masseuses do not hold military rank, but they will receive all courtesies extended to Officers, including first class accommodation. . . .

Nurses not being Matrons will officially be known as Sisters and Staff Nurses; nevertheless, all Staff Nurses will, as a matter of courtesy, be addressed as and known by the title of Sister.

Any member of the Nursing Service who in the Australian Military Forces held a higher position than that given in the Australian Imperial Force will rank, be known, and addressed according to her position in the Australian Imperial Force.

72. Promotion will be by merit, and not by seniority alone.

73. Members of the Army Nursing Service are under the command of the Officer Commanding the Unit to which they are attached.

As regards medical and sanitary matters, and work in connection with the sick, the Matrons and Sisters are to be regarded as having authority in and about Military Hospitals next after the Officers, and are at all times to be obeyed accordingly, and to receive the respect due to their position.

Orders given by Matron, Sister, and Staff Nurses, with regard to nursing of patients, must be obeyed by rank and file, but in other matters Nursing Staff must not exercise any authority over rank and file.

Members of the Army Nursing Service are not permitted to accept presents of any kind from patients or friends of a patient during his illness or after his departure.

[The duties of Matron-in-Chief, Principal Matron, Matron, Sisters, and Staff Nurses were laid down in these *Standing Orders* in some detail.]

82. MASSEUSES will be treated similarly to Staff Nurses. They will take orders from and report directly to the Medical Officer upon all matters relating to the condition and treatment of their patients. Matrons will be the medium of all communications of an official nature to and from Masseuses on other matters.

Neither in pay nor in other matters were there any steep gradients between the several "ranks" of the Australian Army

Nursing Service. While the members of the service as a whole were graded as "officers" (whatever that may mean) the lowest pay, that of the staff nurse—in effect the "private" of the service—was the same as that of the private soldier; that of the matron-in-chief was the equivalent of a lieutenant's. Thus, if the service was graded as "officer" it was paid as "other rank".²⁸

²⁸ At first matrons received 9/-, sisters 6/-, and staff nurses 3/4d. per day with field allowance at 3/6d. per day, and a further 2/6d. per day when rations were not given. Later the rates were:

The uniform of the nursing service reserve originally established by the Federal Government was based on that of the New South Wales service. Miss Gould states that in 1899

The question of Uniform (for the N.S.W. service) was settled by our Medical Officers, Colonel Williams and Lieut.-Colonel Vandeleur Kelly, who obtained a red cape from the War Office as a pattern, and also the regulation cap (muslin hemstitched square). The dress was of dark grey serge (made in Australia) with, in addition to the red cape, a three-quarter length cape of same and a bonnet for outdoor wear. The plain trimming was of brown as worn by the Army Medical Corps. Working uniform was of grey zephyr, washing capes (scarlet) and the muslin-square caps. These capes were made for us at the Army tailors. Before the matter was finally settled, I was called to go with the Colonel to see General French (Commander of the New South Wales Forces) and he approved of the arrangements to be made for the uniform.

The uniform of the A.I.F. nurses closely conformed to the Australian Military Forces²⁹ pattern, and thus to that of the British Army Regular Service, the chief difference being that chocolate facings were used for the badge.³⁰ It included the Red Cape, which thus, with little thought of any possibility of the storm that it was to arouse in France,³¹ had a legitimate—

	Pay per diem	Rations per diem	Total per diem
	s. d.	s. d.	s. d.
Matron-in-chief	15 —	—	15 —†
Matron	12 6	2 6*	15 —
Sister-in-charge	10 6	2 6*	13 —
Nursing sister	9 6	2 6*	12 —
Staff nurse	7 —	2 6*	9 6

* When cooked rations not provided.

† With allowance of 10/- per diem to include all allowances.

Nurses on appointment were granted an outfit allowance of £21, and at first were given £16 per annum for maintenance or renewal. Later the outfit allowance was provided by an increase of 10d. in the daily pay of all ranks, with another 10d. for washing.

²⁹ The term "Australian Military Forces" (A.M.F.) replaced that of Commonwealth Military Forces (C.M.F.) at the time of the introduction of Universal Training—1911.

³⁰ The South African uniform was wholly admirable both in its design and colour-scheme—a "khaki" motif adapted to the feminine taste.

³¹ In the British Army it had come to be the sign of *Regular Army* status—the non-regular members of the Q.A.I.M.N.S. did not wear it. Consequently its wearing by A.I.F. nurses had results akin to those proverbially associated with that colour.

In the uniform of the British Territorial (*Reserve*) Nursing Service the red cape was replaced by a grey cape with broad red border. Nurses of the Red Cross and Order of St. John wore no cape: and those worn by the nursing services of the other dominions did not conflict with the Regular. A practical issue arose when (as with the R.A.M.C.) the members of the "Regular" service came to occupy almost all the senior hospital and administrative positions, and the red cape became, to all

and even formal—introduction into the Australian service. The indoor uniform, showing the red cape, appears in plate No. 19.

On return from Egypt in his tour of inspection 1915-16 General Fetherston reported to the Minister that Australian nurses suffered considerable disability through absence of badges of rank indicating their position as officers.³³ He recommended that the following badges—in oxidised copper—be worn on all uniforms by all nurses: Matron-in-Chief—crown; Principal Matron or Matron—three stars; Sister—two stars; Staff Nurse—one star. The Adjutant-General concurred, the Military Board concurred, and it was ordered on 18th April 1916.

Many nurses expressed their disapproval of the step. Thus Miss Grace Wilson:

Badges of rank (as worn at present) I am frankly not in favour of. I think that women should wear distinctive badges from men. As it is it means nothing. The Canadians wear it also, but they get the pay of the rank they carry on their shoulder equally with the officers of the same rank.

Miss B. Belstead says:

In 1916 an order was issued that nurses should wear stars. It was reluctantly obeyed. An order issued to maintain the dignity of a Sister and to protect her from familiarity, surely an unnecessary precaution. Her profession, her uniform and her womanhood had already done both.

intents, a "staff" badge. That complications should arise when the A.I.F. nurses served with the British was natural, and they were sometimes acute.

Nevertheless, the red cape became also the mark of Australian nurses; and that some great British nurses rose far above the smallness of this controversy is shown by the following incident recorded by Sister Nicholls:

At No. 4 British General Hospital at Etaples, in 1916, certain Australian Staff Nurses (attached for duty) shared in labours that they recall as among the heaviest in their experience. Time off duty was scanty; but Australian soldiers at Etaples let no chance pass of seeing these women from Home—and knew them at sight by their Red Capes. On a certain dark autumn evening, the British Matron of this great hospital, in company with an Australian Staff Nurse, both in red capes, passing to the nurses' quarters was hailed by one as a compatriot. The Australian soldier and the Staff Nurse were saved embarrassment by the Matron's prompt reply, "I'm not an Australian nurse, I am British, but we wear their uniform."

A controversy curiously similar in its social content was roused in Australia after the war by the assumption by various civil hospitals of the red cape as part of their uniforms, and its wear even by untrained women. The contention by the nursing service that the military significance of this emblem should be enforced by law was not upheld in view of the fact first that it was not then legally part of a military uniform and therefore not protected by law from general wear.

³³ The various uniforms are displayed on life-sized models in the Australian War Memorial, Canberra.

³⁴ "The nurses," he pointed out, "had the privileges of officers much as chaplains have, and neither have any real military rank." Nurses, he said, were often not given the proper respect to which they are entitled because their position is not understood either by officers or other ranks. The Canadians gave their nurses "relative" rank as officers and indicated them by the ordinary military badges of rank,

A Sister who had seen over four years' service told me she had never heard a man swear during that time, except, of course, she added, the Medical Officers! My apologies to the profession but the truth will out.

THE CONTROL OF THE NURSING SERVICE

In 1914-15 the A.A.N.S. shared with the Australian Army Medical Corps the disastrous results of the failure of the Australian Government and Defence Department to make any effective provision for its internal administration, direction and discipline. This could have been done by the appointment of a Matron-in-Chief on the staff of the D.M.S. The reason for this obvious neglect was partly the outlook of the first D.M.S. of the Australian Imperial Force, Surgeon-General Williams, who expected that he would control them as a D.M.S. on the staff of General Keogh—or at least that they would come immediately under General Keogh himself. The Australian Nursing Service would then have been controlled by the Matron-in-Chief at the War Office—Miss Becher. The resulting failure to provide for the internal self-control of the service was even more severely felt in the nursing service than in the medical, and the unhappy results of it still rankle. It is not to be questioned that the loss to the service of a woman of such commanding ability as Principal Matron Bell was a serious one. That story has been told in the first volume—the best epitaph with which it may be buried is the statement (quoted in *Volume I*) of the Acting Registrar, No. 1 A.G.H. (Major J. T. Tait) that

The outstanding feature of the work of the nursing staff through all the vicissitudes of the administration was their devotion to their duty. They made it plain that they were there to nurse and care for the sick men, and that duty they were going to perform in spite, if necessary, of rules and regulations and military procedure.

A vital step in the welding of the A.A.N.S. into a corps was the creation, through the initiative of Colonel N. R. Howse, then A.D.M.S. of the 1st Division, of a Medical Headquarters and Headquarters staff for the A.I.F. under himself as D.M.S. Miss Grace Wilson says:

The organisation in 1916 was a great help; it changed us from a disconnected body going to all and sundry officers for advice and help to carry out our own little ends, into a corporate body with one head. . . . [It established] the position of the A.A.N.S. in the eyes of the world and the taking of our definite place amid the other nations—we developed *esprit de corps*.

The new medical department of Australian Administrative Headquarters included a Matron-in-Chief with a small but sufficient staff charged with the onerous responsibility of administering, under the D.M.S. the A.I.F. nurses in almost every theatre of the British front. To this post General Fetherston, then visiting Egypt, appointed Miss E. A. Conyers, a Victorian nurse on the staff of No. 1 A.G.H.³⁴ The Matron-in-Chief had to attend to the personal interests—posting, promotion, pay, discipline, leave, invaliding, reinforcement, and other concerns of this widespread body of Australian women;³⁵ and the war produced evidence that Australian women are not greatly different from her men in their individualism and democratic outlook. "Administration", therefore, was much less cut and dried than in the British Service.

In April 1916 the staff of the D.M.S. was transferred to England and with it the Matron-in-Chief, A.I.F., Miss Conyers.

From Australian Administrative Headquarters at Horseferry Road her sphere of administration included England, the B.E.F. in France, and Egypt. On 8th May 1916 a Matron-in-Chief, Miss Tracy Richardson, was appointed to the staff of the Director-General in Melbourne, administering the A.A.N.S. in Australia and the nursing staff of the Australian hospital ships and of the "Sea Transport Sections".

At Australian Administrative Headquarters Miss Conyers came into direct relations with the Matrons-in-Chief both at the War Office and in the B.E.F.³⁶ Within a short time, as will be seen, the relations between the heads of the nursing service had been made much more intimate by new administrative problems.

As part of the general reconstruction the three General Hospitals of the A.I.F. were made approximately equal in their

³⁴ The seniority list of the A.A.N.S. was at about this time revised.

³⁵ For routine the Matron-in-Chief worked under the D.D.M.S. but had direct access to the D.M.S., who decided all matters of policy. (*See Vol. II, Chap. xxv.*)

³⁶ Miss Becher and Miss E. M. McCarthy. The latter held periodical conferences with the Matrons-in-Chief of the Dominion and American forces. For example on 23 Nov. 1917 at a conference in Abbeville there were present:

Matron-in-Chief, B.E.F., Miss E. M. McCarthy, R.R.C.
 Matron-in-Chief, C.A.M.C., Miss M. C. MacDonald, R.R.C.
 T/Matron-in-Chief, A.I.F., Miss Grace M. Wilson, R.R.C.
 Matron-in-Chief, S.A.M.N.S., Mrs. E. R. Creagh, R.R.C.
 Matron-in-Chief, N.Z.A.N.S., Miss Thurston, R.R.C.
 Chief Nurse American Army Nurse Corps, A.E.F., Miss Bessie S. Bell.

establishment. In April, 1916, Nos. 1 and 2 General Hospitals and Nos. 1 and 2 C.C.S.'s went with the infantry to France. During the process of settling in, the nursing staffs were distributed among various British hospitals; an admirable plan followed later with other units.

Australian medical affairs in Egypt were for a time administered by Major D. S. Mackenzie, from General Howse's staff; in nursing matters he sought the advice of the Principal Matron, Miss G. M. Wilson, of No. 3 A.G.H. As the Australian "Auxiliaries" in Egypt were broken up, there was set free a large reserve of nurses who had been sent from Australia to fill the demands of Gallipoli. The "six months' policy" caused them to be redundant to the needs of General Howse in England, and he recommended the return of some 150 to Australia. Some of these were actually sent back, and 50 to India. But, as has been seen, events in Australia and Britain negated this retrograde decision.³⁷

The general administration of the A.A.N.S. during 1916-18 has been adequately described.

It remains to add some necessary notes to what has already been largely told—in the narrative of evacuation, casualty clearing stations, hospitals, hospital ships, and other subjects of the two previous volumes—as to the experience of the Australian Nursing Service in its several rôles and its many theatres in the war of 1914-18.

In the Gallipoli Campaign the sufferings of the wounded from the Landing in the "black ships" on the voyage to Alexandria so deeply impressed the public mind that hospital ships and hospital carriers were substituted for "black" transports. Each hospital ship had its quota of trained female nurses, and to these, under the medical officers, was passed responsibility for the ordering and oversight of all arrangements for the care of the wounded, and for the nursing and "dressing" of serious cases. Of the Australian nurses' work here the British Matron³⁸ in the Hospital Ship *Guildford Castle*, 1915-16, wrote:

³⁷ Surg.-Gen. Howse soon recognised that this action was a mistake. But this officer, eminent in matters of general administration, was not so happy in his administration of the nursing service.

³⁸ Sister E. R. Collins, Q.A.I.M.N.S.

The following members of the A.A.N.S. were attached for duty on the H.S. *Guildford Castle* on July 5th, 1915.

Sisters V. Woinarski, M. Brown, A. King, E. Vierk, C. Sorensen; Staff Nurse Z. Lyons; and Staff Nurse B. Loughrey joined the staff about two months later.

I do not consider any of these ladies showed any deficiencies as regards training. Their devotion to duty was most marked, they are splendid medical and surgical nurses, and proved loyal and willing workers. Their discipline was good—they never once questioned an order given—and they are able to rise to emergencies and proved adaptable under varied conditions.

At the beginning, of course, they did not know the Military Regulations, never having worked under them, but very quickly picked up the regimental parts of the usual routine in Military Nursing. Staff Nurse B. Loughrey was Theatre Sister for nearly 12 months, and did most excellent work, giving great satisfaction to the Surgeons.

All these ladies showed good common sense and judgment; they work well together, and are not afraid of any amount of hard work.

I cannot speak too highly of them, or of their care and devotion to the sick and wounded, and their loyal support to me at all times.

Ordinary civil hospital work does not help one with regard to the Military part of a Military Hospital; all Sisters must know Regulations, and it is impossible to learn all these points unless one is attached to Military Units. It was marvellous how quickly these ladies grasped the Military part of the work, and how excellent they were from a disciplinary point of view.

I am more than sorry that I shall not have the pleasure of working with them all again.

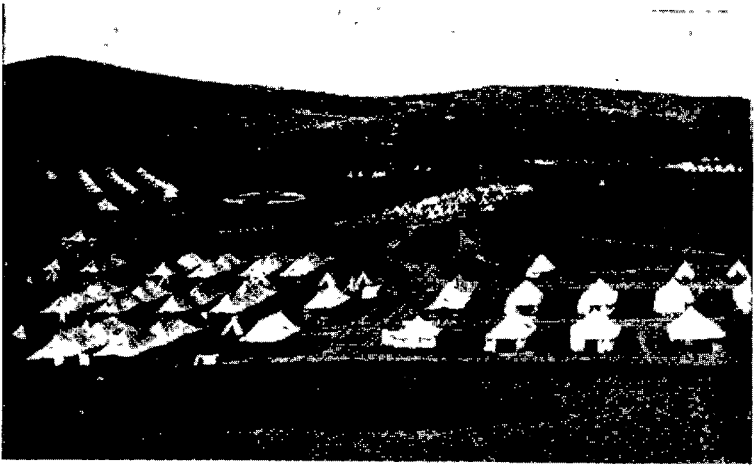
The British General Hospitals at Alexandria were at first staffed with A.A.N.S. nurses, who replaced—or rather supplemented—the trained “nursing orderlies” of the R.A.M.C. At No. 3 A.G.H. at Mudros it was found that the trained female nurses brought order out of chaos in a way that would have been possible to male orderlies only after long training in “Regular” Army service.

This position was not achieved by the nursing service of the A.I.F. without opposition. Officers of the highest standing in the Australian Medical Service were strongly opposed to the staffing of any hospitals in the forward zone by female nurses. But as a result of experiences in 1915 in the advanced hospital centres at Lemnos, on the lines of sea transport to Alexandria, Malta and England, and in the confused and intensely difficult problems of treatment, convalescence and invaliding from the M.E.F. bases, the field of action of the Australian nurse in the evacuation of wounded was appreciably extended.



19. NURSES' QUARTERS IN No. 2 A.C.C.S., NEAR STEENWERCK, 30TH NOVEMBER 1917

The bombing of this hospital is mentioned in *Volume II*, p. 179



20. PART OF 60TH BRITISH GENERAL HOSPITAL AT HORTIACH, NEAR
SALONICA, 1918

The hospital was staffed by members of the A.A.N.S.

Photo lent by Mr D N Henderson
Aust War Memorial Collection No A2205B



21. "WASHING DAY" FOR AUSTRALIAN SISTERS AT 60TH BRITISH
GENERAL HOSPITAL, HORTIACH

Photo lent by Sister V H Kellick
Aust War Memorial Collection No C4337.

To face p 553.

IN A.I.F. UNITS IN ENGLAND, FRANCE AND EGYPT

In England since May 1915 Australian nurses had been serving in various hospitals. No. 1 Auxiliary Hospital at Harefield had been the centre of activity since the arrival of members of the A.A.N.S. With the arrival of the Australians on the Western Front the Australian Nursing Service in England gradually increased. No. 2 Auxiliary at Southall extended to receive 500 patients and its nursing staff soon grew to 40 nurses. No. 1 at Harefield had accommodation for 900 and a nursing staff of 50 nurses, while No. 3 Auxiliary, which was opened at Dartford, soon extended to take 1,200 and employed 63 nurses. Smaller hospitals were also opened for officers and nurses. The flow of casualties after the Pozières operations was so great that many partially fit had to be accommodated in the Command Depots. No. 2 Command Depot at Weymouth grew to accommodate 8,000 patients and its nursing staff included 11 A.A.N.S. nurses. In October 1916 No. 3 A.G.H. from Egypt was established at Brighton to meet the urgent needs at this time.

The nature of the work at the Auxiliaries has been generally indicated in previous volumes though its interest—especially that at No. 2 Southall with the “limbless”—deserves much more attention than can be given.

The size of the nursing staff of the General Hospitals varied somewhat with the number of beds, being greatest in No. 3 at Abbeville—General Howse looked upon establishment as his servant not his master. With the casualty clearing stations the nursing staff also varied somewhat with circumstances, but in general averaged 5 to 7 or more.³⁹

Incomparably the most important nursing work in the war was that carried out in the General Hospitals at the Expeditionary bases. The work there, which embraced every variety of the surgical and medical nursing encountered in modern war has been described, so far as it differed from that of a civil hospital, in *Volume II*. But a few comments from the nurses themselves indicate what were to them outstanding problems.

**In Great
Britain**

In France

**In the
Australian
General
Hospitals**

³⁹ On occasion it rose to as much as 30, including teams.

The Nursing Staff and the Quartermaster. Every matron who has recorded her experiences emphasises the importance of establishing relations of mutual co-operation between the Ward Sister and the Quartermaster.

An Australian nurse who served with a British hospital writes:

One thing which impressed me, and which I think we might copy in our Australian hospitals, is that the Matron has control of the orderlies. To me it was a great advantage being able to post the nursing orderlies just to the wards I thought them most suited for.

Miss Wilson stresses the same point:

Ward orderlies. I do not consider that [our] Matrons were given sufficient control over the Nursing Orderlies. Matrons have told me that they never knew from one day to the next what orderlies were available for nursing duties—or when they would go to a ward and find the orderly gone, or another in his place. The nursing orderlies should be as much under the Matron's control as far as their ward work is concerned as the Sisters—if the Matron is to make the best use of her staff. Several instances could be quoted from my personal knowledge to show this. I will quote one—"The hospital was much understaffed with Sisters. In certain wards less acute cases were put to assist the Matron by classifying the cases—in order that the staff might be concentrated where most needed. In these less acute wards experienced orderlies were put—and extra supervision given by the Matron—with an occasional visit from a Sister. In one ward was a screen case, where fomentations were to be applied to allay inflammation; the orderly in charge was quite capable of doing this. One day he was suddenly moved to a store—and an orderly put in his place who had never been in a ward before. The Matron was not informed—had she been she would have visited the ward earlier, or seen that a Sister did so. By the time she reached the ward, towards the middle of the morning, the new orderly had done the treatment to the best of his ability—but in so doing had well burned the screen case. This case had to be removed to an acute surgical ward—and was under treatment for many weeks."

In Imperial Hospitals this could never happen. The Matron places and has entire charge of all Nursing Orderlies—in so far as their ward work is concerned. Also, in the A.A.M.C., ward work is not popular—the ward orderlies are often regarded as "Mugs". The smart boys are put in stores, etc.—ward work is often held over their heads as a punishment, and also there is not the same chance for gaining "stripes" as in stores, etc. In the R.A.M.C., ward orderlies get a slightly higher rate of pay—are given efficiency stripes, and generally are looked upon as the important members of the Corps. This seems the correct way in a unit where the nursing of sick and wounded is supposed to be the chief object. I think that in many ways the ward orderly in a Base Hospital had little chance and in consequence we had a few very good ones—and a large number of very bad ones.

Matrons. Without any malice—as fortunately in my case I had no

cause for complaint—I feel compelled to say, from what other Matrons have told me in confidence, that I do not think that on the whole the Matron of an Australian Hospital was as much considered—or had as much respect shown her position—as the Imperial Matrons had.

Promotion. I do not think that Staff Nurses should automatically have been given promotion at the end of two years. Some nurses, who may do satisfactory work as Staff Nurses, are a thorn in the flesh to any administrator when promoted and put in charge of a ward. They just cannot do it.

Training of personnel. I think a list of trained Nurses should be kept showing those suited for administrative work, for surgical work, including special theatre experience, and for medical work including some with special experience in infectious work. All should be made acquainted with the various Army Forms in use—the routine of ordering different things from the right store, etc.—so that no confusion occurs when they are plunged into a Military Hospital.

To a large extent untrained nurses might be utilised instead of orderlies—but a certain number of men would be needed for heavy lifting and carrying both of patients and stores. The women should be better because I believe they would take more interest. Ward work is not congenial to the majority of men.

Adequacy of staff. The establishment that we had—of 90 Trained Nurses to a General Hospital reckoning say 1,500 beds with possible expansion up to 2,000—was good and workable, and allowed a margin for sickness. This is speaking of a tent and hut hospital; but when, as often happened, we were called upon to send Sisters to the Army Areas, and to work with a depleted staff of say 60, it was not possible to do the best for the patients.

Where large institutions were taken over for use as hospitals more staff was necessary—they were not nearly so workable.

Sisters. Speaking generally the members of the A.A.N.S. were very careless with hospital equipment. They improved very much in this respect towards the end of the war. Would suggest that Matrons and Sisters be clearly shown their duty in this respect—that the duties be laid down in black and white, not in a vague or general way.

I would suggest certain standing orders for the A.A.N.S. on all necessary points. At times it was very difficult in the A.I.F. to know exactly what applied to Sisters and what did not. When “officers” were spoken of sometimes Sisters were included—sometimes not.

Baggage. Baggage should be limited, and this rule enforced. This question has often caused a great deal of worry to Matrons. Q.M.’s are often unable to supply transport for huge quantities of baggage. I have seen Sisters in France travelling with ten large packages. One regulation cabin trunk, one large holdall, a hat bag and one large suitcase, and in addition a small suit case that can be carried in the hand are quite enough under active service conditions—unless in very unusual circumstances. This I have proved in 4 years of moving about in France and in the East.

Bombing. I think that Nurses have proved themselves for danger zones. They have shown a high courage, and good nerve. If a nurse is at all nervous she should be encouraged to acknowledge this frankly without being made to feel ashamed, and moved elsewhere. Also regular leave should be insisted upon, the Nurse not allowed to refuse leave; and

except in exceptional circumstances I think six months is long enough to leave a Nurse in the danger zone.

It was a vexed question whether V.A.D. (Voluntary Aid Detachment) assistants should have been allowed a place in the General Hospitals of the A.I.F. as they were in the British. The feeling of Australian nurses—of whom so many were keen to serve abroad but could not get the opportunity—was against it. By the decision of General Fetherston and, later, General Howse, female workers other than trained nurses were not permitted to “enlist” for duty with the A.I.F. abroad. But they were missed.

An account of the work of Voluntary Aid Detachments in Australia will be found in *Volume XI* of the *Official History, Australia During the War*, by Professor Ernest Scott. The following report, made in November 1918 by Major R. Scot Skirving after a tour of the Australian medical units in France, made at the request of General Howse, gives an opinion of much weight:

With regard to the question of nurses—I dare say if the whole skill and labour of the Sisters could be devoted to the more difficult and technical part of their profession, then their comparatively small numbers, in proportion to the work required of them would not be so apparent to my mind. Unfortunately however, much of their time is necessarily taken up with unavoidable ward clerical work, and the more purely domestic side of nursing. Orderlies however willing and good, cannot wholly relieve them of the latter. I therefore am of opinion that it would be a proper and probably successful measure to relieve the Sisters of much of the more unskilled, less technical part of their duties by employing V.A.D. assistance, at least in bed-making, cleaning, small cookery and the like—thereby allowing the Sisters to give more undivided attention to the patients proper—their dressings and treatment generally.

Australian nurses, wherever they went, were courageous and tactful standard bearers of Australian democracy; and highly illuminating is a social gesture and experiment—militarily impudent perhaps, but “put over” with a success that has made it part of A.I.F. history—carried out by the nurses of No. 3 A.G.H. The hospital, it will be recalled, was at Abbeville on the Somme. It was specially constructed and was held to be one of the best laid out in France.⁴⁰ The sisters’ mess, as fitted out by the Red Cross and adorned with original frescoes by two of the “orderlies”, was spacious and attractive. Hither, on a gen-

⁴⁰ See Vol. II, p. 399. The circumstances here recorded belong to 1918.

eral invitation, during the fighting of June to September, assembled on Sunday afternoons irrespective of rank or any other distinction, a complete cross-section of the A.I.F. meeting on equal terms, drawn by the same nostalgic impulse that desired the Australian atmosphere.

The change in the military status of the C.C.S. from a clearing house to the forward centre for scientific treatment is held officially to date from the allotment of female trained nurses.⁴¹ The Australian C.C.S.'s arrived in France without female nurses but, as the table showing the distribution of the A.A.N.S. indicates, each was afterwards equipped with an A.A.N.S. staff which rose variably from seven to as much as thirty including teams.⁴²

C.C.S. work was intimately bound up with the surgical team, one of the most characteristic features of surgery on the Western Front. Here again the female nurse formed part of the normal establishment.⁴³

The sort of work that the sisters were called upon to do varied very greatly. In heavy rushes it was first-aid pure and simple.

I arrived at the C.C.S. about 10 a.m. . . . (writes Sister Belstead). The next a.m. the Matron took me to some huge marquees and said she wanted all the patients dressed before 10 a.m. "Can you get them done Sister," she asked. I looked at the stretchers—in long rows everywhere—"I'll try" I murmured. But in spite of trying I was not able to do it and another sister came along to help me. . . . The next few days was a continuous stream of wounded each one seemingly as bad as could be. Eight theatre teams working day and night yet it seemed impossible to cope with things; and the men were such bricks, lying on their stretchers waiting for their turn on the operating table. One realised this was war indeed. If one had time to think we would have just been weeping hysterical women but we'd only time *to do*. It was only afterwards that one thought and realised how as a matter of necessity we had done little or nothing for those who had died.

Sister I. I. Lindsay states:

The highly trained nurse is wasted at C.C.S. Extensive training not so important as resource and readiness to meet crises and get through the work—fussiness is a nuisance.

⁴¹ See Vol. II, pp. 26n and 357, and *British Official Medical History, General, Vol. II*.

⁴² During the battle of Bullecourt No. 3 C.C.S. had 17 nurses, and in Third Ypres 34, including 12 team sisters. Six tables were kept constantly going and the hospital included English, Canadian, American and Australian teams.

⁴³ An Australian officer, Lt.-Col. P. Fiaschi, obtained permission to employ two orderlies highly trained by himself. His unit was certainly highly efficient.

The thing is—*get through the work*—a pair of rubber gloves—basin of disinfectant. The finicky sister could not get anything done—would have half the ward unstarted. Go for essentials—food, calls of nature, dressings. *Medical comforts* are an important part of this nursing; so are ability to cook for the sick and to get Red Cross things and wangle—eggs from Q.M., etc.; and also, of course, physical health—energy and determination, interest and keenness on work, cheerfulness and sense of humour. A nurse must not be *too sensitive about pain*—must not “take on” too much.

On the question whether nursing sisters are desirable at the C.C.S., with few exceptions medical officers were entirely in accord as to their value. Outstanding exceptions were Colonel Barber (who, however, had no experience of casualty clearing station work), and Colonel Giblin (whose experience was confined to Gallipoli).

The following statement by Sister B. Belstead probably puts the general point of view of the nursing service:

I am strongly of the impression, from my own experience, that sisters are required at C.C.S. The cases will not get the treatment they really require from orderlies, who have not the training required. The cases would bleed, for example, and not be looked after really well. The boys when on their own, or the majority of them, are helpless for really bad cases, which would often get into a serious condition without this being noticed. It is not men's work unless specially trained; and they feel it so.

Of course we could not have done without orderlies.

She adds:

I was at “Nine Elms” (No. 3 A.C.C.S.) first, till we left in a hurry when the place was badly shelled. We had a very comfortable time at the C.C.S. I found things much more comfortable at C.C.S. than at No. 3 A.G.H., Abbeville. We had plenty of coal, etc. You could get things so much easier; get anything you wanted; the nearer the front the easier to get things. Work was very heavy in patches, worse than in a General Hospital but at times almost empty. I was in the theatre a good lot of the time, and at busy times we had a day and part of the night without stopping. The worst time was at Esquebec when Kemmel was taken. The work at C.C.S. and General Hospital can hardly be compared—they are so different.⁴⁴

One Australian sister was wounded while working in No. 1 A.C.C.S. To the “exciting incidents” and “narrow escapes” recorded in *Volume II* the following account by Sister F. E.

⁴⁴ General Howse's policy of rotation of duty, so that no nurse was kept at the front for more than six months, was not approved of by the British Matron-in-Chief. Her reason was that the work was so special and technical that experience could scarcely be gained before the move was due. Excellent accounts of C.C.S. nursing work will be found in Sister May Tilton's *The Grey Battalion*; Miss K. E. Luard's *Unknown Warriors* is of outstanding literary merit as well as of nursing interest.

James-Wallace of the experience of an Australian sister temporarily attached to No. 61 British C.C.S. during the great German offensive of 21st March 1918 may be added.

I found I was to be loaned to the B.E.F. and was very indignant until I found the whole Staff in 61 C.C.S. practically were Scotch. Had been with them since the 1st March and we had had a fairly quiet time. The C.C.S. was in Ham about 10 minutes walk from the Railway Station, with a Siding running right up to the Hospital. The C.C.S. had been a French Hospital and was beautifully laid out, all huts with electric light, made roads and garden plots.

There had been some rumours of a "push" but whether ours or the Germans' no one seemed to know. The Officers in Hospital talking together said, "Oh, the Germans could never break through here"—impossible.

However at about 3 a.m. on the 21st I heard the engines of a good many German planes overhead, but could see nothing as a fog had been creeping up all night and was now pretty dense. I was on Night Duty with 2 other Sisters for the Hospital.

At about 4.15 a.m. a terrific bombardment commenced, like continuous thunder rolling, then I could distinguish shells screeching through the air and guns going off with a deafening crash the whole place shook and trembled. I had never heard anything like it before, felt quite excited, the Orderlies said "it's something big, Sister", I went out and found another Sister; she was quite mystified too as to what it all meant, we could not see the usual flash on the horizon from the guns the fog was so dense. The noise continued. The patients were unconcerned remarked that "those were heavies" when a shell whistled and crashed. Seemed quite content as they were out of it all and in Hospital. We got some wounded in, but they talked of a British raid and couldn't tell us anything. I realized it was something unusual when I saw the M.O's appearing at 6.30 a.m. instead of 9 a.m. with tin hats on, and tearing round very excited. They began marking up the field cards, and getting the bedded Wards empty by filling the hangars with walking patients. Went to bed about 10 a.m. with everything up side down in the Hospital. Up about 4 p.m. to find the noise even worse, and 3 Anaesthetists for our C.C.S., and 18 refugee Sisters from 41 C.C.S.—which was in the direct line of fire. Everything in a turmoil and buzzing with excitement and patients everywhere.

Saw Miss Baird—our Matron—and asked for a job, she asked me to help in the Officers Ward. Found it overflowing, some dying, terribly smashed about, and a good many walkers, we worked hard till dinner time, when I went on my usual 8 p.m. Night Duty. Had the Chest Ward that night, we were full at M.N. of patients with penetrating wounds of the Chest and a lot of them had other wounds as well. Went hard all night. Thicker fog and same commotion.

22nd. Off at breakfast time, and then went down the Ham-Noyon road to the next village, could only see a few yards ahead through the fog, met an A.S.C. boy, he told me the road further on had been shelled badly and lorries blown up and men killed. Still no one seemed to know what was happening. Slept soundly, too tired to be disturbed by noise.

About 2 p.m. wakened to the sound of "Girls! Get up quickly, you have to be dressed in 10 minutes, the train goes in 20. We have to leave everything."

Who said so? We must pack. What is the matter? But we tumble out.

Miss Baird comes in to our Nissen Hut, "Are you up girls? The Germans are advancing, we have to leave everything. Train goes in 20 minutes, take what you can carry". Exit all of us—with suit cases, boots, rugs, haversacks, dorothea bags in our arms, to see the rest of the Sisters in the same plight waiting at the Mess Hut. Dinner half eaten, I feel jolly hungry. Bright sunshine, clear sky. Troops, waggons, lorries, ambulances, gun-carriages, pack-mules all clattering down the road past the Hospital. One couldn't take in all that was happening. Guns still crashing and shells whistling. Two big naval guns of ours near by, made a good deal of noise.

Some of the M.O.'s meet us and we tramp down to the Station, feeling very disgusted at being sent off when we feel the patients need us. We ask what is to happen to them. Why can't we stay with them? Everyone asks questions and no one answers. We find one M.O. with 10 Orderlies and 20 Labour Corps men are to stay and get the Patients away. The M.O.'s march off. We wait for the train and hear it is not to be in for half an hour.

After begging hard I get a reluctant consent from Miss Baird to go back to the Hospital and pack, promising to be away only 20 minutes. Mess Orderlies are carrying things down on wheel stretchers. Two Sisters come with me, and we tear up to our Quarters and pack madly helped by the boys, who work like trojans, perspiration streaming down their faces. They take my trunk and carry all and even roll up my bed and blankets, but I have no time to put my name on it, and that bundle I never see again. I dash into the Mess Hut and collect a little food, pack another Sister's belongings and back to the Station by a short cut. It is now nearly 3 p.m. Lots of weary looking Tommies and some Poilus with tin hats and pack up at the Station. The 34 Sisters and what luggage they have collected—a good deal—is piled up on the Station.

Crash! A shell bursts about 200 yards away French and English Soldiers rush to see where it fell, then another crash a little nearer. Our two guns continue to fire. Crash! Crash! An earsplitting sound seemingly beside us, black dust rises in the air just behind the Station Shed, some falls on our hats. The R.T.O. hurls himself out of his office and shouts to us to run to the other side of the line, which the soldiers have already proceeded to do, we grab our suit-cases, haversacks, rugs, etc., and struggle over the line, in a few seconds the platform only holds our pile of luggage. I don't expect to see my collection of treasures any more. More shells fall round the Station, we are told to walk down the line to meet the train. We proceed very hampered with our heavy suit-cases, the men come to our rescue and help to carry them. Suddenly 5 Bosche 'planes come in sight. Our Archies open up. We are told to go in the dugouts along the line, but very few do, most of us sit on our luggage and watch the fun. They seem to be trying to find our 2 big guns, they go again after dropping a few bombs.

Some Canadians appear with 2 flat trucks on an engine and helped

by some South Africans get our heavy luggage on, and invite us to ride too. They seem to regard the proceedings as a diversion and pile our luggage up about $\frac{1}{2}$ mile away down the line, we ride back with them and meet the rest of our party. (Two other Australian Sisters and 3 South Africans have been loaned to the C.C.S.) Some Officers come down the line too, their men carrying their kit. More shells burst down along the line, fall just a bit short. We watch the Hospital train go up for the Patients, the shells seem to burst very near it. The line round to the Hospital is hit and 3 men killed where we went across from the Station. It is now nearly 6 p.m. and no sign of our train. The C.O. of 41 C.C.S. suddenly appears with the news that he has procured 5 lorries to take us all to Rosières. Once more we pick up our baggage helped by some men and take it across to the road. Some Irish Officers of the Ulster Division talk to us as we board the lorries. They shout to their men to take cover as we see a fight between some of our 'planes and the Bosche close by. We move on so don't see the end of the fight. Pass lots of men and lorries and limbers and a few guns on the road, horses and guns by the road side, further on men marching towards us. Passed 2 dead Germans lying in the ditch, with the broken 'plane not far off, they had been attacking the road and been brought down. Passed through Nesle, Roye, Marchlepot, Chaulnes, etc., took the wrong road and nearly got to Péronne, past through very desolate country some all old shell holes grown over, and old trenches and rusty barb wire entanglements. Iron bridges blown up over Canals. Bright moonlight heard bombs not far away, it got very cold, we were covered in dust. We went through villages, nothing but a heap of bricks and a few stone walls, a few feet high, trees that looked like sentinels, just the charred trunks and a limb or two standing. Got to 47 C.C.S. Rosières at 10 p.m. Equipment of other C.C.S.' piled about all round it. Patients pouring in. Received very kindly and given tea and bread and butter. Found an old friend there on Night Duty and camped in her bed.

23rd. Found there were lots of spare Sisters about, so my friend and I decided to go and see some French and German Trenches about a mile up the road, the fields between the trenches were a mass of shell holes overgrown with grass and as far as we could see in one direction running in a semi-circle were rusty wire entanglements. Troops and lorries were running up and down the road by the C.C.S. and refugees in streams. Was told I would go on Night Duty, so was off to bed when the call to be "Ready in 20 minutes to go" once more reached me. Miss Baird was to take 7 Sisters to a Railhead. Four of us were Australians and one South African and a Scotch and an English Sister. We thought the Colonies were well represented! The Colonel of 61 C.C.S. Miss Baird and 5 of us departed in an Ambulance, the other 2 followed in a lorry with our belongings. We found Villers-Bretonneux was our destination. Got out at the Railhead Siding. Found we were to be an Entraining Centre and look after the wounded till they got on the trains. We were given a wooden hut which was being used by the sentries of a huge Petrol Dump which was a few yards away. The shed had some forms and 2 stoves in it. Major Grenfell paid us a visit; he had been in charge of the advance surgical supply depot in Ham. He sent us some Panniers and wool and gauze which we proceeded to cut up and get ready. We were supplied with plenty of wool, gauze bandages, safety-pins and splints, but very few instruments and lotions. Pot. Permang.

and Iodine we used for everything. General Skinner paid us a visit. We were billeted in a large school close to Fifth Army H.Q. (Gen. Gough's) about 15 minutes walk and had our meals at a corner café across from the main station. Forty Orderlies arrived, mostly from 41 C.C.S. A good number of patients came through, but went on the train which went out in the evening. The last of us went to bed about 1 a.m. Two of us had been to bed and came on for the rest of the night. We found our school was being shared by refugees.

24th. Got to the shed about 7 a.m. to find about 500 patients, stretchers and walking cases. We fed them all and dressed the worst wounds. Abdominal and Chest cases we brought into the hut, the rest had to stay in the open. The Orderlies were awfully good, mostly Irish boys. They helped to cut up bread, open bully beef tins by the hundreds, biscuit tins; and made up the fires and had boiling water and helped with dressings. Others were busy making boilers of tea and opening tins of milk. Wounded kept coming in all day. One train went out at night taking walking wounded. Got to bed late.

25th. Got to the Shed to find about 8,000 wounded.⁴⁵ Fed them all and went on dressing as hard as we could, more kept coming in. The space on either side of the hut and facing the line was covered with stretcher cases for hundreds of yards; the back bit, the hut and field kitchen were for the walking wounded. Col. Turner and Capt. Marshall were the only M.O's, they had some tents about 12 put up, two double dressing Tents. So three of us dressed the patients there, having the worst stretchers carried there to be dressed. The worst cases we kept in the Hut. Two of us were kept busy dressing outside and feeding the new arrivals. Later—More M.O's and Orderlies came. We had a double Tent full of Officers some very badly wounded. About 10,000 had been through our hands and still they were pouring in in lorries, Ambulances, etc. Very few trains getting them away. Thousands of Indians and Italians (Labour Corps) were being entrained and sent down the line. The only complaint I heard from the wounded was that they—the Labour Corps—were going and they had to wait. The only Australians I saw, were men running the engines of the Goods Trains.

Going back to the School about 11 p.m. Bright Moonlight. Fritz started to bomb the town. We were nearly home when one seemed to fall beside us with a deafening splitting sound. We dived into an archway, the air seemed full of fumes and gas, 2 other Sisters behind us fell flat on the pavement. However none of us were hit and we got to the School.

26th. We got down to find still more walkers and stretchers, they seemed to be everywhere and some were there from the day before, feeling the cold a good deal. They were very thirsty, dirty and some covered with blood. We had a frightfully busy morning. Hospital trains came in, but could not cope with the numbers. At 12.30 we were sent up to the school to pack, had a hurried lunch at the Corner Café, finished packing the things in the Dressing Tents, heard a shout that the train was going out, ran down the hill, passed through the Hut where our very bad cases were as we had left our haversacks there. We were too hurried to think of the effect our leaving would have on them. I will

⁴⁵ This must represent an eye-witness's estimate. Accurate record would be impossible.

never forget the expression on their faces when they saw we were going. "Oh they are leaving us", "They are going". I heard one man say. I went back to tell him we were going on a truck train and they would be going as soon as the Hospital train arrived. It didn't seem to comfort him much. They looked as if they thought their last hope had gone, poor things, we hated leaving them, and it made us realize our being there meant more than the actual work we did. We just scrambled into the van. Miss Baird and one Sister missing it. It was a very long truck train full of walking wounded. We went very slowly and stopped just after nightfall. Brilliant moonlight and very cold. We, with the help of our Orderly—an excellent boy—piled all our kit bags together put our rugs on top and tried to sleep. About 10 p.m. we heard Fritz, and after that we had a terrible night of bombing. Fritz was over us, and driven off by Archies and back again and driven off and back, so on all night. A lot of the men went out in the fields. A dud dropped beside us, the line blown up in front of us. We heard in the morning we were in a cutting just out of Amiens and the town was bombed severely that night. It certainly was the most nerve racking thing we had been through, to hear Fritz' engines above us all night, it was a relief to hear the bark of the Archies and the sing of the shells through the air, we could hear the bombs explode, they seemed all round us.

27th. We got into and through Amiens about 11 a.m. to see telegraph wires smashed and frame work in splinters and broken glass everywhere. Trains were going out of the Station loaded with French and English troops. We pulled up after going under a bridge and the boys found a Goods Train loaded for Ham—they helped themselves, but did not forget us, we were presented with bread, oranges, figs, milk, cheese, apples. We had tea and sugar which we gave the boys and they made their tea at the engine.

After some more travelling we stopped at a Station where there were a lot of New Zealand Gunners, they saw us and brought us tea and very good tea it was, they told us the 3rd Division (they thought) of Australians, and more, were down with them from the North, and were full of confidence, it was fine to talk to them.

In an appendix to her admirable report on the work of the Nursing Service of the B.E.F. the British Matron-in-Chief

refers to honours gained by Australian nurses
Dangers of service in B.E.F. for bravery in the face of danger :

The first Military Medals to be gained by members of the A.A.N.S. were those of Sisters D. G. Cawood, C. Deacon, A. Ross-King and S/Nurse M. J. Derrer who "displayed great coolness and devotion to duty during the bombing of No. 2 Australian C.C.S. by the enemy on the night of July 22nd, 1917". The following details in connection with the raid will give some idea of its severity. One of the wards was struck, 2 orderlies (Pte. Wilson of this unit and Pte. Cox of the 9th Australian Field Ambulance temporarily attached) were killed, 2 patients were also killed, 13 patients injured, and 2 had shell shock. The bombs fell between the mortuary and the ward. The end of one tent was torn and broken, the other tent was completely down, and the

two attached tents punctured with fragments. There was an immense hole at the rear of the ward, the trees thereabouts being scarred and the mortuary in pieces. The body of one of the patients was found on his stretcher, the stretcher being embedded in the ground. During the same day, a piece of shell had fallen within a few feet of the same man. Another patient was not to be found, and it was believed that he was blown to pieces.

The work at No. 2 C.C.S. continued heavy for some time.

In addition to the Military Medal gained on this occasion, Sister A. Ross-King was mentioned in Despatches in January 1918, and awarded the A.R.R.C. in June, 1918.

In September, 1917, the Military Medal was awarded to

Sister A. M. Kelly No. 3 Australian C.C.S.

Sister R. Pratt No. 1 Australian C.C.S.

Nos. 3 and 1 Australian Casualty Clearing Stations had been frequently shelled and bombed and Sister R. Pratt was severely wounded during a bombing raid.

The seventh Military Medal was awarded to Staff Nurse P. Corkhill in August 1918, whilst temporarily attached to No. 38 C.C.S. This unit was subjected to two severe air-raids during the week ending July 27th. On the 19th, three bombs were dropped, one falling in the middle of the camp, wrecking the sterilising room. A few days later, bombs were again dropped right into the camp. Fortunately on both occasions, the casualties were small. Miss Corkhill was on night duty at this time and displayed great courage and presence of mind.

In January 1919 Head Sister C. M. Keys, A.A.N.S. No. 2 Australian C.C.S. was awarded the *Medaille des Epidemies (en vermeil)* in recognition of the valuable work done for the French at this unit, where many poor civilian refugees had been cared for.

During the A.I.F.'s first year in France (1916) the nurses, especially at No. 1 A.G.H. Rouen, had a very hard time indeed.

Early Hardships

This hospital had not been equipped, as were the British, with stoves; and coming fresh from Egypt it was quite unprepared for the rigours of Europe.

These conditions were afterwards improved. Miss Grace Wilson, who at the end of 1917 acted temporarily as Matron-in-Chief, A.I.F., reported to the D.M.S., A.I.F.:

Complaints were received that nurses in the C.C.S.'s had more comforts and warmth in their quarters than those at the base. This was carefully investigated. Certainly the base hospitals were cold during the severe weather but all have stoves and comfortable mess rooms.

In the sleeping huts it would be desirable to have more stoves. At No. 3 Australian General Hospital, where, I believe, the complaint originated, I saw both the O.C. and Q.M. who assured me every effort was being made to secure more stoves. None of the hospitals have sleeping

huts entirely without stoves, though in some cases there may be only 1 or 2 in a hut containing 12 bedrooms. The quarters at the C.C.S's are probably warmer. The huts there are of the Nissen type and lined. It must, however, be taken into consideration that the staff in these units varies in the winter from 5 to 15. The mess room is small and easily warmed by one stove. It is very much easier to make small quarters warm and comfortable than to do this for a large staff of 90, also, against the extra warmth obtained by living in small quarters, must be set the more arduous work, longer hours, and greater discomforts of work at C.C.S's.

I cannot feel that the comfort of the sisters is overlooked.

In Egypt there arrived in September 1916 No. 14 Australian General Hospital (520 beds) with Principal Matron

In Egypt Creal in charge of its nursing staff. No. 14 took over from No. 3 A.G.H., which then went to England. Besides the staff of No. 14 there were now 74 Australian nurses remaining in Egypt including the 31 at Choubra Hospital for Infectious Diseases.

The casualties from the Light Horse were treated almost exclusively at No. 14 A.G.H. with an occasional overflow to No. 31 British—partly staffed by Australian nurses.

Work in the British hospitals is described by an Australian sister:⁴⁶

On my arrival in Egypt, I, with nine other Australian Sisters, was detailed for duty in the 27th General Hospital, Abbassia, and we were attached there for eight months.

The hospital was a double general and the nursing staff, about 100 Sisters, was mainly English, with a few New Zealanders, Australians and two Canadians.

I have nothing but the most pleasant recollections of my stay there both Matron and the Sisters being very good to us, and I was glad of the opportunity of studying slightly different methods in nursing for the R.A.M.C. officers. The patients were British Tommies and New Zealanders and the nursing comprised both Medical and Surgical cases.

Of course working in Base Hospitals one had practically every convenience the chief difficulty being the trouble to obtain boiling water for sterilisation purposes and the part the Primus Stove has played in the Hospitals in Egypt will not be forgotten by the Sisters and orderlies.

After some months I was attached to the 31st General Hospital and later on to the 88th, in both of which the cases were mainly medical and of great interest to nurses not accustomed to Mediterranean fevers.

No. 14 A.G.H. was the centre of Australian medical interest in this seat of war. Conditions there were admirably constituted

⁴⁶ The writer unfortunately cannot be identified. See also *Vol. I*, pp. 764-766.

to re-create Australian surroundings as is illustrated by the following:

The Hospital was situated a short distance from the main part of the town (Port Said) and was reached by a row of about ten minutes duration in a small boat. . . . The surroundings were picturesque—the blue Mediterranean Sea on the one hand—the endless desert on the other. . . . The Es-Salt “Stunt” had just been fought and there were many surgical cases in hospital. Our only means of sterilising instruments or obtaining boiling water was by means of the Primus Stove—it has been invaluable in the nursing of soldiers. . . . How long and hot those days were commencing with reveille at 6 a.m., breakfast at 7 a.m., duty at 7.30. There was much to do. . . . The patients helped us most willingly and were often affectionately promoted by general consent to be O.C. of the primus or C.O. of the medicine or linen cupboard. Indeed good humour abounded. . . . Wonderful good nature existed between the patients. They visited each other from ward to ward every day. The wards were the setting of much interest. Fun, dry humour, and tragedy were all there. As may be supposed there was a great variety of personalities amongst the Billjims. . . . There was a home-like atmosphere in the wards—smoking was allowed. Clad in their blue suits which never fitted properly—thereby adding quaintness—they sauntered about the wards, helping here and there—going messages for the Sisters—sometimes putting rubber heels on their shoes, always ready to chat. . . . Many and wonderful were the tales told in the bedside groups. I heard a group of boys—aged from 19 to 21 years—talking of when they were young. So much had they crowded into their life abroad that their youth seemed to them a far-off period. Despite the variety there was much in common with them all.

THE A.A.N.S. SERVING WITH THE BRITISH

The 130 Australian nurses who formed the Australian contingents that entered the Q.A.I.M.N.S. Reserve—and others who entered it on their private initiative—formed part of that splendid British Service, and to it their history also belongs. Applications from some of them for transfer to the A.I.F. were disallowed by the Australian authorities. At least one of these nurses, Sister E. King, was wounded while serving in a British C.C.S. in France. No official records from which their story could be told are in the Australian archives⁴⁷ but *In Grey and Scarlet* by Miss R. A. Kirkcaldie gives an excellent insight into this experience.

The A.I.F. nurses who, in very much larger numbers, served with the British—at least those in the Western theatre of war—

⁴⁷ It should be stated also that the Australian Matron-in-Chief, like General Howse himself, kept no records.

were looked on by General Howse as constituting a reserve for the hospitals of the A.I.F. Indeed he had no other source of reinforcement for the service in replacement of "casualties" (through invaliding and marriage) except the few nurses absorbed from the Sea Transport Sections. Those A.I.F. nurses, however, who served with the British in other theatres of war were on another footing altogether, and the endeavour to administer them from Horseferry Road, London, was the cause of administrative neglect and confusion so detrimental to efficiency.—indeed, it may be said, so farcical—that it should for ever prohibit any attempt at repeating the experiment of a central administration overseas controlling in detail every part of a far-flung jurisdiction. As will be seen, this confusion and the need for rectifying it constitute the administrative history of this most important section of Australia's nursing service in the First World War.

The A.I.F. nurses attached to the British served chiefly (in order of numbers) in India, Salonica, and France.

Though nominally administered by the D.M.S., A.I.F. from London the Australian nurses in India were from the outset **In India** actually controlled and administered, for promotion and seniority and as well for disposal and posting, either from Australia, or else as an entirely independent administration. As the Acting Matron-in-Chief, Miss Wilson, has put on record, "We could never keep in touch with them at Horseferry Road."

The first batch of nurses who reached India from Egypt in July 1916 were distributed to the various garrison hospitals.⁴⁸ At the time of their arrival cholera was rampant and two of the nurses contracted this disease and died.⁴⁹ By the end of October 1916 some 148 A.A.N.S. nurses were serving in the various hospitals in India.

At first things went very well. In September 1917 Matron G. Davis at the Victoria War Hospital, Bombay, wrote:

This is the best "War Hospital" in Bombay; we get the best work as it is the nearest to the docks. We cannot take any infectious cases as we have only three wards of 200 beds each.

⁴⁸ These nurses were transferred to England in Jan. 1917 and were allotted for service with British hospitals in France.

⁴⁹ Staff Nurses K. Power and A. V. O'Grady.

I have been given it in recognition for what Australia has done. Eventually it is to be staffed by Australian Sisters; at present I have 24 of those whom I brought, the remainder are to be changed gradually. We are all well and happy and glad to be at work.

Everywhere we go the Australian Sisters are spoken of in the highest of terms by Matrons and O/Cs.

On 6th October 1917 the War Office cabled to the Defence Department for 100 trained nurses for the expansion of units in India. The Minister for Defence approved and they arrived in December 1917.

Five large war hospitals were staffed entirely by Australian nurses,⁵⁰ and volunteers in varying numbers were detailed on hospital ships—a duty regarded as active service and very popular. Volunteers also were sent to other parts of India and Australian nurses served in Burma, Peshawar, Quetta, Naini Tal, Belgaum and Bangalore.

But—except on the hospital ships—it was not like active service work; British nurses, who had been sent to Mesopotamia, were doing that. The nurses, who had been told in Australia that they were being sent to India for six months, had a natural sense of grievance, increased by other conditions that will presently be mentioned.

On 22nd January 1918 Miss E. Tracy Richardson, the Matron-in-Chief in Australia, made the following representation to General Fetherston:

I wish to bring under your notice many Australian Sisters have written to me, that they are very disappointed at not being allowed to go to Mesopotamia, where it is understood they are greatly in need of Nurses.

The English Sisters have been there over two years, and their only chance of relief is from England, while many Australian Nurses are only too anxious to go.

Our Nurses say India is not considered Active Service, and some say they will be called "cold footers" after the War.

The reason given why they were not sent to Mesopotamia is that the Australian Government will not allow them to go there. No request for such has been sent to the Indian Government, and I suggest that a cable be sent to the Indian Authorities as under:

"Unofficial information received Australian Nurses in India are not considered on Active Service and not sent Mesopotamia owing instruc-

⁵⁰ Freeman Thomas War Hospital, Bombay; Colaba Hill Hospital; Colaba Hospital, Bombay; Deacon Hospital, Poona; St. George's War Hospital, Poona.

tions Australian Authorities (stop) This Government makes no restrictions (stop) Desire Australian Nurses sent wherever most needed (stop) Considerable number reinforcements available replace those if sent Mesopotamia (stop) Knowledge of them getting on Active Service will assist volunteering."

This telegram was sent by the Minister for Defence and on 25th February 1918 the Viceroy of India recommended that after six months in India Australian nurses should be sent to Europe and replaced by fresh nurses from Australia. Thus far only two batches had been transferred from India—50 to England and 30 to Salonica.

The next development was a telegram to Australia, sent on March 31st by the highly competent Principal Matron of the A.A.N.S. in Bombay (Miss G. E. Davis) :

The 22 nurses arrived 27th inst. and I am pleased to be able to report all of them are well. They travelled overland from Colombo and were well looked after by Capt. O'Neill, R.A.M.C. I am very distressed that they have come as I have no work to give them and am afraid they received a very poor welcome. I did not know they were coming until I had a wire from Madras from Capt. O'Neill as H.Qrs. had not said they had been asked for. When in Bombay in January Miss Waterhouse said no more were to be asked for. We haven't a bed in India to give them so they are out on the H.S. *Egypt*. What is eventually going to become of them I do not know. . . .

I am very pleased to hear of the likely visit of Gen. Fetherston and only wish he would come now and see how wicked it was of the Indian Govt. sending for those 22 nurses. Really the 100 who came out in December have not been wanted. When they can get them so quickly from Australia I think they might wait until we want them as we can always carry on for 3 weeks while they are on the way.

In May 1918 General Fetherston, then in Europe on his visit of inspection, cabled for 200 nurses, 100 for France and 100 for Salonica. The 100 for France were to be sent from India being replaced after consultation with the Indian Government by nurses from Australia. Fifty left Australia in October and fifty in November, 1918.

In 1918 there were approximately 520 trained nurses serving in the military hospitals in India—320 A.A.N.S., 120 Q.A.I.M.N.S., and 80 Indian Nursing Service. At that time the Australian nurses staffed seven large general hospitals, and also four hospital ships, one working near Vladivostock and others between Egypt, Basra and India. There were twelve smaller

hospitals for Europeans. General Fetherston at this stage insisted on the Australian policy, of which more will be said presently, that hospitals in which Australian nurses worked should be entirely staffed by them.

The nurses who served in India had other causes for dissatisfaction than those mentioned. The Indian Government had deducted income tax from their pay. A member of the A.I.F. Pay Department, who had to be sent from London to India found that the allowances were not commensurate with the conditions of service. The privileges of British nurses were in many cases greater. Also Australian nurses were not used to the best advantage. The Pay Representative reported to the Defence Department in August 1918 that many of the nurses "resent the fact that for months they have been practically idle, and where work does exist it is not real nursing". To show how empty some hospitals were this officer appended the following table to his statement:

Hospital	No of beds	Occupied Approx. No of beds	Since	No. of Aust. nurses empld.	No of other nurses emp d.
Victoria War Hpl., Bombay	600	100	1.1.18	40	
Alexandra War Hpl., Bombay	250	30	10.17	26	
Colaba War Hpl., Bombay ..	550	400		15	20
34th Welsh General, Deolali	3,000	300		42	20
44th British General, Deolali	1,200		11.17	23	10
Deccan British War, Poona	1,200	300		46	4
King George's Hpl., Poona	600	60	1.18	27	1
Hislop Hpl., Secunderabad ..	750	200	1.18	10	12
Station, Bangalore	500	busy		18	2
Freeman Thomas Hpl.	500	100	10.8.18	27	10

To further show the general slackness I wish to state—

- a. Two Australian sisters were employed on sick parades at the docks for a period of three months.
- b. 20 Australian nurses at the Victoria War Hospl. darned socks and sewed on buttons and tapes for a period of two months. For this period no patients were in their wards.
- c. At 44 British Gen. Hospl., Deolali, for two months there were 23 sisters to do duty in two wards containing 60 convalescent patients. For a period of 9 months, for 4 months there were 300 to 500 patients and for the other five months the patients ranged from 43 to 200 and were all convalescent. As the stock was new, there was no mending even to keep the 23 nurses employed.

- d. I might add that it is the general opinion amongst nurses that convalescents are retained in hospital to justify the existence of large medical staffs.

The basic reason for dissatisfaction seems to have been a lack of intelligent co-operation of the kind that brought about the medical disasters of Mesopotamia. The lack of co-operation between India and Australia seems to have been due to a casualness on the part of the British administration in India.

The social atmosphere also in India was in some respects alien to the Australian outlook. While Australian nurses had an insatiable interest and curiosity in their surroundings and a keen eye to their proper "leave", they desired and expected worthwhile work and plenty of it. Speaking generally they got instead an unsatisfactory and not always ingenuous "deal" on the part (it would seem) both of Australia and of India.⁵¹

The next most numerous contingent of A.I.F. nurses serving with the British was the body—originally 273 strong—that left Australia in June 1917 for **At Salonica** Salonica. If the India nurses did not get sufficient active service, the experience of this force was very different.

The four units for Mesopotamia were in charge of Principal Matron Mrs. McHardie White, who also acted as Matron of No. 1 Unit.⁵²

After consultation with General Birdwood, the higher grades in this force were filled by nurses from Australia (mainly those returned from the front) and by 30 from Egypt and 30 from India, who met the units in Egypt, where some of the necessary exchanges were made; 146 nurses arrived at Salonica on 30th July 1917, 91 on August 13th, and 92 on August 14th. The fourth unit was, as already explained, kept temporarily in Egypt.

Few Australian nurses in the war can have found themselves among associations more inspiring, scenes more beautiful, or conditions more damnable. The great mountain system rising from the Mediterranean blue, which culminated in the snow-

⁵¹ A good account of the experiences of Australian nurses in India is contained in *With Horse and Mose in Mesopotamia* by Eric Keast Burke.

⁵² Miss B. I. A. Campbell was appointed Matron of No. 2 Unit, Miss E. R. Uren to No. 3, and Miss J. R. Gemmell to No. 4.

capped peak of Mt. Olympus, was a commonplace of the landscape. In the town of Salonica, once the very centre of civilisation, relics of ancient races jostled in the thousand-year-old streets with the riff-raff of the Levant. Northwards, towards the difficult mountainous front the forward-placed General Hospitals lay along the line of communication. In spring the weather was perfect, and the carpet of flowers on the hillsides was surpassed nowhere in the world. But in the winter the Vardar winds exceeded in bitterness and fury anything experienced in France. In the scorching summer, in a country divided between dry and barren hills, sodden patches of marsh, and innumerable small streams, the mosquito problem—and therefore that of malaria, was almost insoluble. Flies and lice—products of the poverty and ignorance of the peasant population—cause dysentery and enterica to be endemic, and typhus a constant menace. Yet a British nurse writes:⁵³

The sisters stood the climate wonderfully well, much better than the men, which was probably due to the fact that they were better accommodated and the cooking of their food properly supervised; also because they had plenty of work to do with little time to think of themselves, and they did not take much alcohol.

The hospital system of the British front at Salonica was in two echelons; a forward group at Hortiach, about twelve miles from Salonica, was used during the winter months, being too insalubrious in summer. The main system was just outside the town of Salonica on the Gulf of the same name, and consisted of a large and important group of hospitals. On arrival of the first detachment 104 nurses were allotted to canvas hospitals recently erected at Hortiach. After a brief period of roughing it, during which some of the nurses who had arrived without equipment were compelled to sleep on the ground and live on the bare army ration of bully beef, jam and biscuits, the conditions improved. The nurses obtained an interesting insight into the behaviour of British, Greek, Italian and Bulgarian patients. On the 27th August the quota of 30 nurses arrived from India to take up their appointments as sisters. The Australian Principal Matron (Mrs. McHardie White) a woman of great ability and insight, insisted on being entirely separate from Imperial

⁵³ In "Nursing in Mesopotamia", by F. M. Hodgins, from *Reminiscent Sketches 1911 to 1919* (by members of the Q.A.I.M.N.S.).

matrons, and dealing direct with the British D.M.S.⁵⁴ This worked well and to his satisfaction.

Toward the end of 1917 the A.I.F. nurses were assembled in four General Hospitals (Nos. 42, 50, 52 and 61).

The retention of the fourth unit—60 staff nurses under Matron Gemmell—in Egypt at first caused surprise in Salonica; but a letter from Lieut.-Colonel A. L. Dawson, the Australian A.D.M.S. in Egypt, stated that the D.M.S., E.E.F. had ordered this owing to two British Divisions having left Salonica for Egypt—where Allenby's Beersheba-Gaza-Jerusalem drive was in full swing. Nurses in Egypt were then very short.⁵⁵

The Australian Nursing Service at Salonica was almost as thoroughly out of touch with and neglected by A.I.F. Headquarters in London as regards matters of pay, promotion and so forth as was the service in India; but Mrs. McHardie White fortunately had power to make temporary promotions. General Howse, on 16th October 1918, pointed out to General Birdwood the "anomalous position" of an Australian

Principal Matron making her own promotions and returning nurses to Australia subject only to subsequent approval by Headquarters, Melbourne. It is due (he added) to the Principal Matron, A.I.F., Salonica, to say that she fills her position exceptionally well.

Complaints as to the treatment of the Salonica nurses at the hands of General Howse's administration in London led him at one time, early in 1918, to urge their withdrawal and transfer to the Western theatre of war. He pointed out that 62 had been invalided to Egypt or Australia mainly through malaria.⁵⁶ The Mediterranean was now safe for hospital ships, and therefore the primary reason for sending Australian nurses to Salonica had gone; and he desired to have them available in a theatre in which Australians were fighting. When, in Feb-

⁵⁴ Maj.-Gen. Sir M. P. C. Holt.

⁵⁵ Col Dawson cited the case of five British hospitals staffed as follows:

Hospitals	No. of Beds	Nurses
Citadel Hospital	1,040	57
27th General Hospital	2,000	77
70th " "	1,450	73
71st " "	1,060	18
Choubra Infectious Hospital	370	20

⁵⁶ Of these forty-six were sent for a short rest, six for six months' rest.

ruary 1918, General Keogh asked for another unit for Salonica it was decided not to send one; but the question of withdrawal was still undecided when the war ended.

General Howse had suggested that the difficulties of administration be solved by dividing the A.I.F. abroad into an Eastern and a Western sub-division, those in the Western being administered from London and those in the Eastern from Cairo. A decision however was postponed and the war ended with this difficulty also still unsolved.

The "attached" A.I.F. nurses in Egypt were more happily situated as, by the time of the final offensive, the Australian nurses both in the Australian and British hospitals in this theatre of war were under adequate Australian administrative control and nearly all the Australian troops were nursed by them. Some nurses of the fourth unit for Salonica moved up through Sinai as far as Deir el Belah, but in March 1918 they were recalled to Egypt and at intervals between April and October were embarked to Salonica.

In France and England good work was done by the A.I.F. nurses attached to the R.A.M.C., but at the cost of great administrative discomposure, as both official reports
Service with the British: France and England by British Matrons-in-Chief and personal notes by Australian nurses make clear. Sister I. I. Lindsay writes:⁵⁷

To Boulogne, met by Miss Maud McCarthy, who arranged for friends to go together. We (four of us) went to 4th British General at Etaples, a tent hospital and stayed there six months. Matron a charming woman. We wore red capes as she did, her Sisters did not wear capes. Very happy at No. 4 but life and work very hard. To work at 7, going hard all day—12 to 14 hours, chiefly surgical cases (some from Vimy Ridge direct). Put in charge of all head injuries. For night duties we had one Sister and an Orderly and two V.A.D's to 170 cases. In June went to No. 3 A.G.H.; work very slack and was never so hard as with the British, and the food much better.

Another nurse, Sister Belstead, whose judgment and temperament give much weight to her views, says:

I have been attached to two British Units—one, a C.C.S. (of which more anon), and the other, one of those most difficult of all units, where, the Medical Officers and Orderlies are British and the Nursing Staff Australian. I spent four sad months there and as far as I was capable

⁵⁷ A member of the quota that left Australia in November, 1916.

of judging, these mixed units are one of the biggest mistakes that we have made. From our point of view, we had all the disadvantages of both B.E.F. and A.I.F. and the advantages of neither. I may have been unfortunate in the particular Unit to which I was attached, but, of the 100 sisters on the Staff I think not one could be found who was not glad to pass on when her time came. Australian Sisters have been and frequently are very happy when with an entirely British Unit. But a hospital should be entirely B.E.F. or entirely A.I.F. as regards those in authority or in my opinion the result is disastrous.

I next was sent to a British C.C.S. and worked there for two months—four Australian sisters went up there together, but one was shortly transferred to Italy and the other two after working through all the rush of the Cambrai push went down sick, and, here was I, a lone Australian in the B.E.F. Four months previously this would have struck terror to my soul, but those four months had taught me many things and I was more than satisfied to be where I was. Matrons, Sisters and Medical Officers were all most kind and courteous to me, and I was sorry not to be able to be with them for longer, but my leave was very overdue and the Matron did not like to apply for leave for her own staff until I had had mine.

The British Matron-in-Chief in France, Miss E. M. McCarthy records:

In February, 1917, 111 members of the A.A.N.S. were sent over by the Australian authorities for duty on Imperial units in France. From time to time they were re-inforced, until in May, 1917, there were 155 serving in Imperial units, apart from detached members of the Staff of the three (Australian) General Hospitals.

They were sent to British General and Stationary Hospitals and Casualty Clearing Stations all over the British zone, gaining most interesting and valuable experience, sometimes at the most forward stations, but largely out of touch with the Australian Matron-in-Chief and General Howse at Horseferry Road. Difficulties as to their pay were frequent, and those of their promotion practically insoluble. So great were the administrative difficulties that the British Official Medical Historian finds it necessary to make a polite but strongly intended criticism.

The upshot of these difficulties and similar ones in other theatres of war was that, rightly or wrongly, the D.G.M.S. in Australia entirely changed the existing policy by securing the enforcement of a suggestion already made by him.⁵⁸

Promotion. It has not been possible with Nurses not under the direct control of Australian Services, to have any regular system of promotion. To obviate this it is desired that the proper proportion of Seniors and

⁵⁸ In his memorandum of 8 Dec. 1916.

Juniors be appointed namely 1 Sister to 2 Staff Nurses and that such proportion be accepted by Imperial Authorities.

In order to do this and to obviate a very common source of complaint by the Nurses themselves namely their isolation from friends, it is desired that the Imperial Authorities instead of having the A.N.S. Nurses scattered in many Hospitals often widely separated, should arrange that the whole of the Nursing Staff of certain of the War Hospitals in England, France, and elsewhere should be composed of A.N.S. Nurses. This would allow an Australian Matron and a proper proportion of Sisters and Staff Nurses. I am sure they will do better work if together and it will be much easier to arrange for pay and to carry out all undertakings given by Australia to the Nurses.

It might mean a little reorganisation of some War Hospitals but can I think be fairly asked. The Department could undertake to supply necessary reinforcements to keep the various Staffs up to the strength as soon as requirements are known. Such a step will greatly popularise service with Imperial Authorities.

The War Office was now accordingly asked to withdraw the A.I.F. nurses from the various units in which they were serving from C.C.S. to Base and assemble them in three central British units. This request was acceded to at great inconvenience to the British authorities and general disconcertion on the part of the A.A.N.S. As Howse wrote to Fetherston:

I wish to God you could have heard the cry of anger that went up from France when order went out to gather them (the nurses) in hospitals.

Matron-in-Chief McCarthy writes:⁵⁹

At the beginning of June, 1917, a War Office letter was received, requesting that these members on duty in Imperial units might be grouped together in three British units, working under Matrons of their own service. It was decided therefore to hand over

No. 25 General Hospital requiring staff of 100.

No. 5 Stationary Hospital requiring staff of 20.

No. 38 Stationary Hospital requiring staff of 35.

The Matron-in-Chief A.I.F. was asked to suggest the grouping of members, and to nominate the Matrons. The Matrons chosen were:

No. 25 General Hospital, Hardelet. Matron A. M. Kellett, who took over on 10.7.17.

No. 5 Stationary Hospital, Dieppe. Matron J. Miles Walker, who took over on 11.7.17.

No. 38 Stationary Hospital, Calais. Matron E. S. Davidson, opened on 14.7.17.

⁵⁹ From "Report on the Work of the Australian Army Nursing Service in France" by Miss McCarthy, Appendix to Report to the British Director-General at the War Office.

It was with considerable regret that this change was effected, as the services of the A.A.N.S. Sisters were valued, and much needed in the units where they were then serving, and as the three Hospitals had to be staffed with trained nurses only, the percentage of trained people in other units was considerably diminished.

The changes actually involved much trouble for the hospital organisation in France. The acting Matron-in-Chief there wrote to Miss Conyers on July 17th:

You will forgive my pointing out that the moves of members of the A.A.N.S. lately have been enormous. For the grouping of the three Units we have had to bring down Nurses employed on special work in C.C.S.'s, in Stationary Hospitals, in Army Areas, and from the Bases where certain of the Sisters were working in special departments, and this has meant a good deal of re-arrangement and in some Units a little inconvenience. I would therefore be very grateful if no further moves than are absolutely necessary need be made at present.

The new policy was, at the Australian Government's request, applied in all theatres of war. The concentration in India and Salonica has already been alluded to. In Egypt Australian nurses serving with the British were brought mainly to No. 31 General at Port Said; in England, to Croydon War Hospital. In France, No. 25 General, to which most of them went, was at Hardelet, a delightful spot, but with drab and unexacting work.

In November 1917 the Matron-in-Chief, A.I.F., reported that a great many of the patients at this hospital were convalescent; there was little to do in some sections. "I think it is a waste of time for our trained nurses." In December 1917 owing to the shortage of Australian nurses for Australian units the D.M.S., A.I.F. asked the War Office that these 81 nurses be made available to make up the deficiencies in Australian hospitals. By February all had been released.

In November 1917 No. 38 Stationary Hospital in France was suddenly ordered to Italy. The Matron-in-Chief, B.E.F., wrote to her colleague of the A.I.F.:

When the Hospital moves the Nursing Staff is not to move with it. I saw the Commanding Officer who spoke in the very highest terms of the Matron, Miss Davidson, and the very capable staff she had under her. If nurses are able to join this Unit later, he would be very glad if they might proceed with him. I have no definite orders at present, but I am writing to ask if you and the D.M.S. approve of my selecting 27 of this Staff, should I be asked to supply nurses at a later date.

General Howse approved; the hospital opened at Genoa with 520 beds for the treatment of British troops in Italy, and was staffed entirely by Australian nurses under Matron Davidson. Eight additional Australian nurses followed to complete the establishment.

Australian nurses also received experience on hospital trains on the Western Front. In March 1918 nurses from No. 3 A.G.H. were posted for duty in order that they might have experience in this branch of the nursing. They were so employed for a term of six months after which they were changed and replaced by other Australians. The work was interesting and eventful.

Hospital trains

THE MATRON-IN-CHIEF'S PROBLEMS

The arrangement made by the Matron-in-Chief of the B.E.F. with the Matron-in-Chief, A.I.F. (always subject to General Howse's personal control) was that all correspondence concerning A.I.F. nurses in France should pass through her office except that A.I.F. Headquarters might deal directly with matrons in France on confidential matters; or, in emergency with any unit, forwarding a copy of the communication to the Matron-in-Chief, B.E.F. It was also a condition that correspondence must not be unduly delayed by this procedure. She was asked to leave undisturbed as long as possible nurses in certain wards for acute cases—the A.I.F. would supply more nurses from England in preference. The D.M.S. agreed to allot nurses to particular hospitals only when some special reason existed for doing so: in practice whenever the A.I.F. Headquarters indicated its wishes in such matters they were carried out by the British Matron. An effort by General Howse, however, to give Australian nurses from England six months' duty in France in rotation was objected to by the Matron-in-Chief of the B.E.F. because of the difficulty of training nurses in so short a time to the work at the C.C.C's.

As to promotions the general policy laid down for the A.A.N.S. (as for the A.I.F. in general) was "promotions within authorised establishment". For an Australian at A.I.F. Headquarters to control the promotion of nurses working

under the British Matron-in-Chief in British hospitals was obviously generally impossible. For some of the higher appointments selection by merit was in some degree possible—though in the British A.A.N.S. complaints of preference being given to the Q.A.I.M.N.S. over A.A.N.S. nurses inevitably occurred. As for promotion from “staff nurse” to “sister”, in March 1917 General Howse tried to cut this Gordian knot by getting approval from Australia to promote all Australians in the proportion of one sister to two staff nurses—and then doing this by promoting all staff nurses who had served for two years. Unfortunately this resulted in recommendations by British hospital matrons for promotions to deserving Australian staff nurses being met by the statement that these nurses were not due for it. Inasmuch as efficiency is bound up with the promotion of deserving individuals this system brought dissatisfaction.⁶⁰

Unfortunately no statistics of sickness among A.A.N.S. nurses are available; only from Egypt is there an indication of the percentage of it, where it varied from 3 to 5 per cent. As stated elsewhere there were indications that nurses' health in general was better than that of the male personnel.⁶¹ Nurses admitted as patients to hospital were allowed to select from the staff any medical officer as their medical attendant, subject to the supervision of the consultants.

On the Western Front the good health of the nurses was largely due to prevention of excessive periods of overstrain. Leave was made a matter of exact policy in the A.A.N.S. Australian nurses in France were when possible given ten days' leave to England once in six months with annual “short leave” to Paris. This policy was fairly maintained. For example, the number of Australian nurses on leave for the months of December 1917 and January 1918 was:

⁶⁰ In the British Service provision existed for promotion to “Assistant Matron”, in the Australian Service these duties were carried out by a “Head Sister”—which was not a rise in rank. In the Canadian Service there was no gradation between sister and staff nurse.

⁶¹ It was a matter of common observation and official comment that in the matter of communicable disease (without reference to venereal disease which so far as can be ascertained was entirely unknown) the health of nurses in a unit was markedly better than that of the male personnel. This is attributed to the greater individual care and fastidiousness in their personal and general hygiene.

Ordinary leave to U.K.	82
Sick leave to U.K. (3 wks.)	9
Ordinary leave to Cannes and Mentone	32
Convalescent leave to Cannes	7
Ordinary leave to Paris (14 days)	17
Special short leave to Paris	23

"As we have only 488 nurses in France," remarked the Acting Matron-in-Chief, "there seems no cause for complaint."

Facilities for enjoyment in England for nurses on leave from France and in England were provided for by the A.R.C.S., under whose care the nurses came officially for "Comforts" and general amenities, and also in Paris where accommodation was specially provided for Australian nurses through the Princess Victoria Clubs for Nurses. The Australian Red Cross Society also made available to Australian nurses, sick or on leave, their Hostels in the South of France. The Matron-in-Chief at A.I.F. Headquarters kept a careful watch on the health of her nurses in that theatre; she saw all members of the A.A.N.S. returning to England and boarded all considered tired, posting fresh nurses in their places. The British Matron-in-Chief records that this automatic replacement of casualties was of great help as she was always able to depend on a fixed number of nurses. Between September 1917 and May 1918, 100 nurses were returned to Australia on transport duty or as invalids. The nursing staff on the Australian Hospital Ships *Karoola* and *Kanowna* and on the Sea Transport Sections were permanent. Many nurses needing a change were allotted as staff to transports returning to Australia with invalids.

A special hospital for sick nurses existed in England, the Q.A.I.M.N.S. Hospital at Millbank, London, and a number of Australian nurses were treated there. In July 1916 a convalescent home for Australian nurses was opened at St. Albans, Hertfordshire, with accommodation for 20.⁶² In June 1917 a hospital to accommodate 25 Australian nurses was opened at Southwell Gardens, South Kensington, London, by the generosity of Mrs. T. Hall who (with her housekeeper, Mrs. Nicholson) personally maintained and controlled the domestic staff and arrangements, freeing the Sister-in-Charge from that task.

⁶² The following numbers stayed at this convalescent home in 1916—166, 1917—255, 1918—251.

Here medical boards were held on sick nurses. The following summary of the first twelve months' work is of interest—

- 200 patients were admitted. Of these
 - 1 wounded in an air raid at the Western Front.
 - 13 operation cases—the operations being performed at No. 2 A.A.H. Southall.
 - 59 chest complaints, including bronchitis, pleurisy, pneumonia, influenza, and only 3 T.B. lung.
 - 25 suffering from debility.
- The remainder, minor complaints and accidents.
- Altogether 48 have been invalided to Australia.
- 25 recommended to light transport duty.

As in the Australian nursing profession in civil life, the discipline of the Australian Army Nursing Service was exceedingly effective and reasonable.⁶³

Discipline

THE END OF THE WAR

The end of the war came almost unexpectedly upon the A.A.N.S. as it did upon all other services, but it did not mean a cessation of heavy, indeed crucial, work. In France at the end of September 1918, the A.A.N.S. nurses had been withdrawn from No. 74 General Hospital at Trouville and from No. 5 Stationary Hospital, Dieppe, to fill vacancies in Australian hospitals. All hospitals now became busy with the rush of sick, which began to reach epidemic proportions in all theatres of war early in September. After the Armistice, although the flow of wounded ceased, influenza kept the nursing service more fully occupied than they had been in times of fighting. A nurse in Salonica recorded:

Influenza cases came pouring in. The men had been in the country so

⁶³ Gen. Howse's attitude to the matter of discipline in the nursing service is exactly conveyed by the following from a letter to the D.G.M.S. Australia dated 11th Jan. 1917. Referring to certain nurses who had been returned to Australia in 1916 he said:

"While submitting that the nursing abilities of many of those returned is above question, you must admit that certain nurses will not conform to military discipline, which is so essential for nurses, not only to protect the reputation of our units, but more particularly to protect themselves. The temptations which surround the Nursing Staff on service are very great. Fortunately up to the present, we have only had one or two unfortunate episodes, and I have been able to avoid any publicity. . . .

"I can assure you that I have not returned any nurses to Australia (with exception of those returned from Egypt . . .) without first making very careful enquiries and getting a written report on each nurse. These reports have been forwarded to you when nurses have been returned. . . . I have no desire to injure any of our Nursing Staff who have done such brilliant work, I only wish to protect them against their own folly, but am afraid that it would make the Matron-in-Chief's position impossible, if she is asked to receive these nurses on service again. . . ."

long without any leave and were in a shocking condition with malaria, that they had no resisting powers left. In spite of our efforts they died in dozens.

Exactly the same story comes from Palestine where malaria also was raging at this time. In France and England the tending of these influenza cases was the nurses' last big task, and as it petered out the hospitals were gradually closed⁶⁴ and the nurses returned to Australia and demobilised.

Most nurses used the opportunity that presented itself after the Armistice of making themselves acquainted with the world **Non-military** at large, but a number also enrolled in the **Employment** scheme of "Non-military Employment".

The report of the Department of Repatriation and Demobilisation says:

Over three hundred of them were placed in various occupations, the most popular of which were those pertaining to the preparation for home-life. An examination of the first two hundred and fifty applications received shows that sixty-nine of these were for domestic economy, fourteen for infant welfare work, and ten for cooking. Professional subjects claimed the attention of seventy-eight, while the call of the open road induced fifty-four to seek proficiency in motor driving, presumably as an adjunct to their future career.

The following is a detailed list of the subjects taken by the nurses as supplied by the Matron-in-Chief:

Domestic Science	77	Singing	6
Motor Driving	77	Pianoforte	3
Cooking	35	Dispensing	3
Sanitation and Hygiene	34	Languages	3
Midwifery	23	Electro Therapy	3
Massage	20	Housekeeping	3
Infant Welfare	14	Drawing	2
Horticulture	14	Bookkeeping	1
Health Visitors	12	Ionisation	1
Business Course	10	Dancing	1

THE NURSE'S "CALLING"

A vexed matter on which something remains to be said is the question of the value of female nurses as against that of medical orderlies in some conditions of war. **Male and female nursing** The nature of the work of the male "medical orderlies" has been referred to in the previous volumes.

The relations between these two groups of nursing personnel

⁶⁴ See Vol. II, Chap. xxv.

has been given too little attention in Australian Army manuals. Modern sick nursing demands a high standard of technical training; and if skilled "nursing" is urgently needed under circumstances that are held to be outside the field of action of the female nurse, either male "orderlies" must be trained to that standard or else the sick or wounded man must, as best he can, seek the nurse, instead of *vice versa*.⁶⁵ The question became acute in connection with the attachment of female nurses to the casualty clearing stations.⁶⁶

In the circumstances of stationary warfare the attachment of nurses to the C.C.S. presented little difficulty, though, as at Brandhoek and Steenwerck in 1917,⁶⁷ it involved some danger. But in the German offensive of 1918 the female nurses rightly or wrongly were sent far to the rear.

It seems probable that in the conditions of motor mechanised and "total" war the problem of the Army nurse may prove even less amenable. On the other hand the circumstances of "total" war have immensely extended the scope of female war work, so indeed, that woman has become a factor of major importance in the medical machinery.

The allocation to her of the task of the detailed care of wounded in war is as old as any deliberately historical records. The story of modern nursing both civil and military, is simply the history of successive advances in the attitude of civilised communities towards (1) the "education" of woman, and (2) her admission to positions where she should exercise control, or command, over members of the male sex. In the latter respect woman's position was considerably advanced during the First World War.

For the scientific basis of its art modern nursing has to look

⁶⁵ Many Australian nurses were impressed with the adaptability of the male orderlies and the readiness with which they acquired a good nursing technique. The following passage from a British history of the war describes a system of work alien to Australian methods and outlook.

"'Pre-op. Ward', the medical officer pronounces, and at once the patient is borne into an adjacent apartment. Nursing Sisters are there. They chat with him. He is undressed and cleansed by nursing orderlies with a tenderness and care which vie with that of woman herself" (*The Great War and the R.A.M.C.*, by Lieut.-Col. F. S. Brereton, R.A.M.C.)

⁶⁶ Col. Barber, D.D.M.S., Australian Corps, was at first strongly opposed to the use of nursing sisters in "Stationary Hospitals" and casualty clearing stations. He based his views on the belief that the presence of female nurses would tend to "cramp their style" and make them less mobile. He subsequently relaxed somewhat in his views.

⁶⁷ See Vol. II, pp 186-188 and 386.

to the profession of medicine. But the elemental purpose and motive power that sustains its activities, and even the more essential services that make up its technique, have an origin fundamentally different from that of "science". The most primitive motive in nursing derives from the maternal instinct, and in a less degree from the impulse that springs from the emotion of sympathy. "Science" and scientific medicine, on the other hand derive chiefly from the instinct of curiosity.

Nursing looks intuitively as well as scientifically to the healing power in nature, *vis medicatrix naturae*; and medical reliance on that principle often means, also, reliance on the nurse. She is also relied on for those aptitudes that go to the make up of the successful housewife—in particular those involved in the ordering and maintenance of a cleanly, decent and economical system of domestic economy. This aspect of the nursing service has been set out by an Australian Nursing Sister⁶⁸ as follows:

"Before me lies an old-world thesis on 'Woman', and, all unknowingly, it justifies the presence of Nursing Sisters at C.C.S.'s; on the Lines of Communication; and at Base Hospitals in war time.

"The last sentence runs thus—'for, surely, she giveth her mind to little things', and again—'and so bringeth she order out of chaos'. I maintain that in wartime a nurse is but doing her peacetime work in a new setting—not only has her previous Hospital training made her able to cope with it, but long generations of womenkind stand behind her; for 'surely they can give their minds to little things'. All the Marthas of this world as they run their households have tiny multitudinous duties to perform. It is the rooth woman that can compete with man in the big things of life; but not even the rooth man can compete with woman in the overseeing and performance of the 'little things'.

"In hospital work both in peace and wartime if the little things are not looked to the result is chaos; and as the old world thesis tells us 'so bringeth she order out of chaos': Her old work in a new setting!

"It has been put forward that a woman's emotions unfit her for Active Service in times of storm and stress. For answer I point to the work of the Nursing Sisters in the unequipped hospitals of Lemnos—on the Hospital Ships at Gallipoli, and at the Casualty Clearing Stations of France."⁶⁹

A highly interesting point was mentioned by that great

⁶⁸ Miss Briseis Belstead.

⁶⁹ The note continues with practical comments: "Because of that new setting, adaptability is needed. For this reason, the age limits of the A.A.N.S. should correspond with the adaptable years of a woman's life. After the age of 40, not a few women are apt to become more or less dithered by any change of setting, and, on the other hand, the three cases I have known of Sisters becoming unnerved and having to leave the bombed areas occurred in quite young girls. The women therefore most fitted for Active Service range in age from 30-40. Certainly the baggage of the A.A.N.S. has been something of a problem . . . but by a little readjustment of uniform and equipment the bulk could be reduced by half."

scientist, Dr. C. J. Martin, concerning the freedom of nurses from intestinal disease as compared with medical officers at No. 3 A.G.H. when at Lemnos:

The relative incidence of intestinal disease (he said) was striking. The O.C. appointed a Commission of de Crespigny, Trethowan, Newton (sanitary officer) and myself. We examined into the conditions and arrived at the conclusion that it was the much greater care and cleanliness in handling the nurses' food stuffs which alone accounted for it. Our mess arrangements, behind the scenes, were very bad; the nurses' very good. They told off one of their number for their housekeeping alone. We were in the tender hands of Australian boys whose knowledge and practice was confined to what they may have picked up. . . . The nurses' food stuff was protected from flies, from time of delivery; ours displayed for the delectation and amusement of these insects. There was also the difference in the possibility of hand to mouth infection which would be less in the case of a kitchen looked after by a trained nurse.

Comparing the work of men with that of women an Australian sister says:

Nurses are necessary unless orderlies are very highly trained—some of the orderlies I met were as good as nurses but very few. Many do not attend to *detail*. For example when a patient says he does not want his food, they don't make him something else and see that he gets it. They leave all blankets on top and none underneath; and details of that sort.

A good orderly, of course, is a comrade tending another in trouble and, as has been said before in this chapter, nothing could exceed the gentleness, devotion, and skill of some men fitted by character and long training for the work. There were conditions, whose limits varied, in which if it was to be done, they alone could do it.

The qualities which seem to "call" the female sex to achieve a life-purpose in sick nursing, and in Army nursing in particular, are probably:

(1) A strongly developed *maternal instinct* for the care of the young amplified by the sense of sympathy. (2) a high potential of *courage* (the protection of the young demands the exercise of courage as an organic instinct, when elicited by appropriate emotional stimulus). (3) *Stamina and capacity to endure* long continued demands on mind and body. (4) Acquired *domesticity*, deriving through the fact that woman's most primitive function carries with it, in present society,⁷⁰ the

⁷⁰ In certain animals, and certain races of mankind the care of the young is a paternal function.

acquisition of habits and facilities of a "domestic" kind. (5) *An objective, "practical" outlook on the problems of life.* (6) *Intelligence, and a sense of humour.*

The really extensive part played by Australian nurses in the war was due to the insistent demands of the nursing profession in Australia to take part in it; they achieved **Their achievement** their purpose in spite of the fact that by the Australian "six months' policy" for the sick and wounded of the A.I.F. the normal demand for female nurses was very greatly diminished. Unlike Canada and New Zealand, by an arrangement which, in view of its great economy, was wholly reasonable, Australia provided only a *small part of the medical units and service required by her soldiers overseas*. Many less medical officers, and 1,000 to 1,200 fewer nurses were required by the medical service of the A.I.F. than would have been the case if the full service had been provided. But the determination of Australian nurses to take their part resulted in their making up more than this deficiency by undertaking a more general service.

It is of interest that the Australian nurses working in British units, including those in India and with the Q.A.I.M.N.S., formed approximately 10 per cent. of all the nurses "despatched to war areas".

In her report to the War Office Miss E. M. McCarthy, Matron-in-Chief of the B.E.F., concludes with the following generous appreciation:

The work accomplished by members of the A.A.N.S. during their 4 years' service in France, has been much appreciated. The ready assistance which has always been given by the Matrons and Commanding Officers in times of stress when they were called upon at little notice to send up reinforcements to British or Australian units, has been of the greatest value.

At all times, and whenever they have been called upon to work, the Australian Nurses have rendered cheerful, valuable, and devoted services. They have, throughout their service, maintained a very high standard of work and discipline.

All questions, whether of administration or discipline, in connection with members of the A.A.N.S. have invariably been referred to the Matron-in-Chief, A.I.F., and I am greatly indebted to her for the help and support which she has always given me.

The attachment of A.I.F. nurses to the British Service, though made with the best motives, provided insoluble problems.

Not that the nurses were dissatisfied with their association—there is ample evidence that though Australian nurses were anxious to work with their own units and serve the needs of Australian soldiers, yet when circumstances placed them with British units under conditions which gave full scope for ministration they found their work as congenial as did the Australian medical officers similarly placed. Most of the best men and women who were associated with the British Service became warmly loyal to it.

The narratives of the nurses are in general accord in expressing their high regard for the R.A.M.C. staff from officers to orderlies—the strenuous task set the hospitals “where the Australian nurses worked was made lighter by the mutual accord of the staffs. The R.A.M.C. staffs on their side spoke of the high standard of work and of endurance of the A.A.N.S., and of the cordial relations that existed in the British hospitals.”⁷¹

Yet the notion of organising a nursing service on these lines was as impracticable as would have been that of so organising an expeditionary force. Different Governments remained responsible to the personnel whom they had enlisted in their own forces, and interior economy made it necessary that some form of administrative touch should be achieved by those Governments and maintained. Undoubtedly it would have been better if all Australian nurses allotted for service with the British had entered the British Service direct. The experiment that was made showed abundant reason that it should never be made again.

The Australian nurses were distributed from Vladivostock, through Burma, India, the Persian Gulf, Palestine, Egypt, Salonica, Italy, France and England. One of them records:

We gradually settled into our place as units in one big whole. As the vastness of the world struggle reached our consciousness, we saw no good could come of not working together for one set object—the perfection of the A.A.N.S. in the eyes of the world and the taking of our definite place amid the other nations. We developed an *esprit de corps*.

To sum up her achievement, the Australian trained nurse—who in civil life, by means of her own social organisation, and by the sheer force of “efficiency”, had compelled recognition of nursing as a profession socially so important as to warrant

⁷¹ The fact that the hospitals selected for the A.A.N.S. in France reduced the opportunities previously existing for the undoubted abilities of the Australian nurses for front line work, was inevitable.

restriction to trained and educated individuals—now won her battle also in wartime. And not merely her entrance into the field: by the end of the war the position of the service had been greatly strengthened. The authority of the ward sister in the ward *vis à vis* the male "orderlies", and of the head matron in relations with the medical officers, were not only recognised in fact but were laid down in military regulations. This position had not been achieved without bitter social conflict; indeed it is not even yet complete. But it has been made inevitable by the work of the nursing service in that war.

This also may be said. By its demonstration of the wide field open to female ministrations and the importance of these the work of the nursing service in 1914-18 helped to raise the social standard of the civil profession. It helped to confirm the democratic ideals of the relations between the sexes. But foremost it gave to thousands of Australian soldiers a comfort and sustenance wholly unattainable through any other human agency.

Twenty-one members of the A.A.N.S. died while on service:

Rank	Name	Date	Place	Cause
S/Nurse	BICKNELL, L. A.	25. 6.15	EGYPT	Pneumonia Pneumonia Malaria
S/Nurse	CLARE, E.	17.10.18	INDIA	
S/Nurse	DICKINSON, R.	23. 6.18	ENGLAND	
S/Nurse	HENNESSY, M.	9. 4.19	AUSTRALIA (ex Mesopot.)	
Sister	KNOX, H. M.	17. 2.17	FRANCE	C.S.M.
Matron	MILES WALKER, J.	30.10.18	ENGLAND	Pneumonia
Sister	MOORHOUSE, E. A.	24.11.18	FRANCE	Flu & Pneu.
S/Nurse	MORETON, L. G.	11.11.16	INDIA	Enteric
Sister	MOWBRAY, N. V.	21. 1.16	EGYPT	Pneumonia
Sister	MUNRO, G. E.	10.10.18	SALONICA	Pneumonia
S/Nurse	O'GRADY, A. V.	12. 8.16	INDIA	Cholera
S/Nurse	O'KANE, R.	21.12.18	AUSTRALIA	Pneumonia
Sister	PORTER, K. A. L.	16. 7.19	AUSTRALIA	Influenza
S/Nurse	POWER, K.	13. 8.16	INDIA	Cholera
S/Nurse	RIDGWAY, D. A.	1. 1.19	AUSTRALIA	Pneumonia
S/Nurse	ROTHERY, E.	15. 6.18	AUSTRALIA	Pneumonia
S/Nurse	STAFFORD, M. F.	20. 3.19	AUSTRALIA	
S/Nurse	THOMPSON, A. M.	1. 1.19	AUSTRALIA	Pneumonia
Sister	TYSON, F. I. C.	20. 4.19	ENGLAND	Cerebral
S/Nurse	WATSON, B. M.	2. 6.16	EGYPT	Cerebral
Sister	WILLIAMS, B. E.	24. 5.20	AUSTRALIA	Pneumonia

Thus there died in Salonica 1, Egypt 3, England 3, France 2, India 4, Australia 8. Four Australian nurses of the Q.A.I.M.N.S. are also known to have died on service.

DECORATIONS AWARDED TO MEMBERS OF THE
AUSTRALIAN ARMY NURSING SERVICE, A.I.F.

Medal	MILITARY DISTRICT						Total
	1st	2nd	3rd	4th	5th	6th	
C.B.E.	1	2	1	1			5
O.B.E.			1				1
M.B.E.			1				1
R.R.C.	6	15	17	3	1		42
Bar to R.R.C.			1				1
A.R.R.C.	16	45	51	13	10	3	138
M.M.	1	2	3		1		7
Kaisar-i-Hind Medal (1 Cl.)			1				1
Florence Nightingale Medal			1				1
Mentioned in Des- patches	21	50	54	18	7	4	154
Congratulatory		5	6	1	1	1	14
<i>France</i>							
Médaille des Epidemies (en Vermeil)	2						2
Médaille des Epidemies (en Argent)			1				1
<i>Belgium</i>							
Médaille de la Reine Elizabeth	1						1
Serbian Order of St. Sava (5 Cl.)			1				1
Greek Medal for Mili- tary Merit		17	1				18

CHAPTER XII

THE AUSTRALIAN ARMY MASSAGE SERVICE

FEW occupations have a more curious pedigree than the calling which in recent times has been created by the union (as if one should mate eo-hippus with the latest weight-for-age champion) of the ancient art and practices comprised in "massage" and physical culture, with the therapeutic applications of electricity and other physical forces, so as to beget a social group within the sphere of applied "medicine"—to wit, the modern specialty of "physio-therapy". The practice, in various forms, of "massage" may be assumed to derive from the most primitive method of therapy—as, for example, when the individual gently rubs the painful part or stretches his stiff limbs.

Throughout Babylonian, Egyptian, Classic and Mediaeval times, in domestic ministration, in the gymnasium, the arena, and the Army, may be traced this simple and wholesome art and practice, with its modest super-structure of mystery and even more unpretentious equipment of "science". In this ultra-modern era it emerges from the chrysalis into which it transforms itself in the great war, as a professionally elaborate and scientifically sophisticated branch of medicine, "physical therapy". The simple art of applying skilfully for stimulation or for alleviation after physical injury various physical manipulations, kneadings, rubbings, combined more or less ingenuously with an appropriate element of suggestion and "mystery", has in this new cult been united, *à la mode*, with the highest achievements of scientific research on the ultimate forces controlling the cosmos, applied in the form of radiology, thermal and ultra-thermal radiation, "high frequency" electric currents, diathermy, *et hoc genus omne*.

"Massage" presents itself historically as one element only in a general system of treatment by various "physical" procedures which are inherently related and which have always been distinguished in both practice and philosophy from pharmaceutical medicine and from operative surgery, and which have a more primitive origin than either. For while until recent times pharmacology, with little or no exact science of its own,¹ perched insecurely on an edifice of physiology and pathology, as surgery was on anatomy, the age-old procedures of external therapy had a firm if lowly basis in folk-lore medicine and pure empiric, wholly devoid of allegiance to the changing fashions of theory.

Massage, active and passive muscular exercise, baths, packs, heat and cold, light and air, change of climate were important features of classical therapeutics. The safe, if unenterprising, "natural" and chiefly physical therapy of the clinical school of Hippocrates, when a very few drugs were used with discretion, and which had the virtue at least of "*non nocere*", gave place in the worldly-wise schools that followed to more aggressive tactics and in particular to the polypharmacy of Galen. Rational therapy of any kind, including physical therapy, was almost lost in the morass of polypharmacy and magic in the Middle Ages. This was helped by the blight that settled on medical practice with the divorce of surgery from internal medicine, and the reversion of the latter under hierarchic domination, ecclesiastical and lay, to sheer and unrelieved "mystery"—a degradation from which it is still in the process of recovery—as witness the advertisements of "patent" nostrums.

In the 16th century Ambroise Paré, the first scientific surgeon, re-introduced massage and manipulations into orthodox surgical practice. Other external forms of treatment—application of heat and cold, poultices (plain, and sophisticated), and baths—regained their place in the rebirth of natural therapy with Sydenham, but still with the smirch of "mystery";² so that

¹ The possibility of "real" knowledge of the action of drugs, and the idea of "specific" action had come in the 17th century with the discovery of Cinchona; but it was not till the "606th experiment" of Ehrlich that it was scientifically demonstrated, and it was only within a few years of the war that Cambridge University embarked upon a truly scientific campaign of research into therapeutics and pharmacology.

² In the 17th century medicine was distinguished from the craft of the surgeon and the barber, and was known as a "mystery"—*videlicet*, a "profession".

with spas, medicinal waters, Royal "touchings" and such like they have helped to sustain the "mystery" of orthodox therapeutics and to postpone the "calling" of its bluff until science should have made it safe to do so.

Both on the medical and on the surgical side physical therapy found a new and most potent accession both of science and of mystery in the discovery in 1773, by Galvani, of the "muscle-nerve" phenomenon, and, arising therefrom, the cult of "Galvanism". And in each instance—as always, when man descends to pretence of knowledge for personal ends—it became, as well as a valuable medical weapon, an instrument of humbug. It is, however, heartening to find that in the ignorant exploitation of this potent aid to mystery the regular practitioner was easily outdone by the charlatan. It is not less interesting to observe that the "scientific" investigation of the physiological action of electricity—as by Duchenne (1806-1875)—gave little grounds for its medical use other than as a diagnostic agent.

Massage in the 19th century became largely a lay cult, and by the medical profession its practice was relegated to lay practitioners. (Hendrik Ling—1776-1839—who created the modern scientific school of physical training was a teacher of fencing.) With other forms of physical therapy the investigation of its therapeutic qualities was, in effect, regarded as unworthy of serious "scientific" exploration, analytical or clinical. Electro-therapeutics was almost confined to specialist practice.

At the beginning of the present century apart from Lucas-Champonnière, James Mennell, Wilfred Harris, Reuter Roth, and such kindred spirits fetish and mystery still surrounded the exercise. There can be no question but that apart from the efforts of small schools of scientific practitioners, until the Great War the therapeutic use of massage and electricity was to the general medical profession one of the favourite resorts of defeat or of laziness. The story is not an inspiring one. Disinclined itself to undertake the physical manipulations, the profession as a body was content to employ an enthusiastic, competent, and devoted body of operators in a pseudo-science—based on a slight knowledge of anatomy, physiology, and elec-

tricity—who applied their technique with an enthusiasm and trust in the knowledge and wisdom of their employers that too often was sadly misplaced.

The position in Australia on the outbreak of war in regard to treatment by the various forms of “physical” energy such as are now classified more or less coherently under the term physio-therapy was briefly as follows:

**Position in
Australia**

On the side of the medical profession the teaching in the medical schools paid little attention either to theoretical aspects of physical therapeutics or to their practical exploitation. “Massage and electricity” were prescribed in much the same way as the services of a “trained nurse”, but with little or no idea of the precise therapeutic objective. In Australia, as elsewhere, the medical profession was very ill-informed on the exact therapeutic action of electricity—and, indeed, of all forms of physical therapy. Little endeavour had been made to ascertain whether, and, if so, in what way, the crude “stimulation” of denervate or degenerate muscle by continued or interrupted (tetanic) electric shocks could indeed promote the ultimate welfare of the system. Here was something one could see—some mysterious action, that impressed the patient and the physician alike. You pressed a button and the figure, willy nilly, worked; and was not a change in electric potential at the bottom of all nerve-muscle interaction? What could be more obvious, than to presume that the application of electricity would maintain the “tone” of denervated muscle? And yet what more unscientific?³ What, exactly, was it hoped to achieve?

For some years before the war the practice of physio-therapeutic procedures was confined, by usage, to trained men and women accredited by examination, mostly members of an unofficial but influential body, the Australasian Massage Association.⁴

**Massage in
Australia**

before the war

³ It hardly overstates the case to say that the purpose that underlay much of the pre-war treatment by massage and electricity was little more “scientific” than that of the medicine-man of certain Pacific Islands—who Prof. A. P. Elkin states (“Primitive Medicine Men”, *Medical Journal of Australia*, 30 Nov. 1935.) “uses massage-manipulation so much like our own that we might regard it in the same light; but as a matter of fact its purpose is to act upon an imaginary octopus . . .” (in the patient’s vitals!)

⁴ In some instances female members of the massage specialty were registered members of the nursing profession.

This well organised body of men and women unofficially controlled the "official" practice of massage in each Australian State, a result achieved by collaboration with the medical profession, in particular the medical schools. The "right" to practice "massage" was not at that time controlled by legal registration, but by membership of the Association, which itself was conditional on the passing of theoretical and practical examinations conducted chiefly by medical men.⁵ The three Universities of Sydney, Melbourne and Adelaide provided special courses for massage students in anatomy and physiology. The course was laid down in co-operation with the medical representative on the Board. The position in New South Wales was stated (in a reply to the War Office) by Major Arthur E. Mills (later Professor of Medicine in the University of Sydney)⁶ as follows:

The Australasian Massage Association is one of high standing. Every graduate is well trained both in theory and practice. Lectures are given to the students of the Association at the Sydney University and at the large General Hospitals connected with the University Medical School. The practical work of the Association is carried out in the wards of these General Hospitals. Each student must undergo and pass satisfactorily an examination before receiving a certificate entitling her to become a member of the Association.

When the A.I.F. was created there was no special provision in medical establishments for the employment of personnel trained in massage and electro-therapy. The question had not indeed arisen. The small military hospitals for the garrison troops (Coast Artillery) did not permit of the training even of male nursing orderlies nor had the occasion for their military employment arisen in the South African War. Moreover in the raising of the A.I.F. Australia was guided, (not always with advantage) in military medical matters almost entirely by British precedent. No provision had been made in the British Army for the inclusion of a service of massage,

**Provision for
massage in
the A.I.F.**

⁵ In 1922 a "Masseurs' Registration Act" became law in Victoria. In 1928 a "Nurses' and Masseurs' Registration Act" was passed in Queensland.

⁶ The statement is contained in a memorandum to the D.D.M.S. Surg-Gen. Williams of 15 March 1916, in reply to a request from the War Office for information. The leading exponent of physical therapy and training was Dr. Reuter Roth—later Colonel and D.D.M.S. II Anzac Corps Col. Roth, a virile and very attractive character, was an ardent advocate of the Swedish system of physical exercise. He was also an expert fencer.

for the same reason, it would seem, that for some twelve months. caused the final stage of wound repair to be left to civil clinics—which did not exist! In England this omission to provide for massage had been remedied by a curious and characteristic intervention of private benevolence, the “Almeric Paget Massage Corps” which received military recognition and was assimilated under special arrangements with the medical service.⁷

In Australia the evolution of the Army Service of Massage and Electro-therapeutics was entirely haphazard.

Like all exponents of a therapeutic technique the practitioners of massage were enthusiastic and, there can be no doubt, convinced believers in the value of their art and of the importance of its proper application. In Australia they had maintained a rational and socially commendable attitude on their place in the social cosmos, *i.e.* as the technically skilled exponents of a particular form of therapeutic intervention, under the direction of the general profession of medicine. The maintainance of this attitude was not made easier by the scientific neglect referred to above and a reprehensible carelessness on the part of the medical profession—their employers. Failing recognition as a necessary element in the medical service of the A.I.F. the members of the profession brought influence to bear on any “authority” which they thought would promote their claims.

In September 1914 the Australasian Massage Association urged on the D.G.M.S. the inclusion of a massage department in the hospitals then being formed for service abroad. The Director-General however considered that this service would be adequately met by the members of the trained nursing personnel, who “would train orderlies” to carry out the necessary manipulations.

In December 1914 the Dean of the Faculty of Medicine in the University of Sydney, Professor T. Anderson Stuart, wrote to the Director-General, A.M.F., Colonel Fetherston, recommending that “trained and certified masseuses” be sent with the Australian General Hospitals.

⁷ See p. 601n.

We have found them (he said) *most* useful in the surgical wards at the Royal Prince Alfred Hospital of which I am Chairman. I have constant good accounts of their successful work.

The Director-General however adhered to his decision against the inclusion of certified masseurs and masseuses as such in the A.I.F.

Receiving "no satisfaction" from the Defence Department, in March 1915 the Australasian Massage Association, through the Australian Red Cross Society, offered to send and finance two trained masseurs "if given military recognition". This offer was sent direct to the Australian High Commissioner in London, who however cabled in reply that, if the offer applied to the A.I.F., "military recognition" was a matter for the Defence Department. The War Office, he reported, was "only accepting masseurs as civilians. No commissions available".

In June 1915 a further proposal was submitted to the D.G.M.S., A.M.F. from the Tasmanian Branch of the Australasian Massage Association, who offered to send a masseuse to Egypt, salary and outfit being provided by the Association. The proposal was not favoured by the Director-General, who was, however prepared to accept male masseurs for the A.A.M.C. under the same terms as male nurses, *i.e.*, with the assurance of non-commissioned rank. Early in July action was taken by the Defence Department to ascertain from the Military Districts the number of male masseurs who would be available for service abroad.

Meanwhile the members of the Australasian Massage Association were actively working for an opportunity to exercise their calling in the treatment of the wounded. In the middle of July 1915 the Australian Red Cross Society offered to provide the cost of the salary of two masseuses for service abroad. They were declared by the D.M.S. Egypt to be "not wanted" for the military hospitals and the offer was passed on to the British Red Cross Hospital. The O.C. of this unit accepted the offer—the fare to be paid by the Australian Massage Service but "board and lodging" to be supplied. The Australian Commissioner for Red Cross (Lieut.-Colonel Bar-

rett) recommended that they be sent "as they are sure to find work in Egypt".

In the meantime, in July 1915 (moved it would seem chiefly by continued pressure from the Massage Association, which claimed that "massage is particularly necessary at an early stage in the treatment of certain injuries") the Director-General advised, and the Minister approved, the despatch of a party or "section" of masseurs in the proportion of 1 male to 2 females, males to have pay and privileges of staff-sergeants, females pay and privileges of staff nurses. "Under these conditions they must be prepared to serve for the term of the war, and wear uniform as directed for which allowance will be made."

In August, 1915 six (staff-sergeant) masseurs and twelve (staff nurse) masseuses embarked for service with the Australian Hospitals in Egypt and England. During this month also approval was given for the formation of an Army Massage Reserve in Australia with the following establishment (*Military Order No. 492* dated 24th August 1915):

Military District.	Hon. Lieut. (Masseur).	Staff-Sergeant (Masseur).	Masseuses rank as Staff Nurse.	Total.
1st	1	6	6	13
2nd	1	12	12	25
3rd	1	12	12	25
4th	1	6	6	13
5th	1	6	6	13
6th	1	6	6	13
	6	48	48	102 ⁸

Applicants were expected to provide certificates of "having undergone a satisfactory course of instruction".

In October 1915, a military order was promulgated that "masseuses appointed to the A.I.F. for service abroad will hold rank of staff nurse and will receive pay and allowance

⁸ The first commission was granted in December, 1915.

as follows—7/- per diem". During this month a further batch of ten masseuses embarked for service abroad by the *Orsova*, and in December one masseuse was allotted to and embarked with each Australian hospital ship. So far as can be ascertained, with the exception of one masseuse who left Australia in 1918 and those allotted to "sea transport sections" no additional appointments were made to the A.I.F. of qualified masseurs or masseuses during the war.

Meanwhile in the A.I.F. professional masseurs who had joined up as hospital orderlies and even in field ambulances had, chiefly on their own initiative, found increasing employment as the casualties from the Gallipoli fighting reached the stage of convalescence and chronicity.

**Events in
the A.I.F.**

Resort was had to baths and sea-bathing, but there was "a general demand for 'massage' and other forms of physical treatment". In July the "A.D.M.S. for A.I.F." (Lieut.-Colonel Barrett) obtained approval for the use of local civilian masseurs, and a number—chiefly Syrian—were engaged. In September authority was obtained from Australia for the appointment of masseurs from qualified practitioners of this art serving with the A.I.F., some of whom had already an impressive record of treatments to their credit. In this month also there arrived from Australia the massage staff whose appointment has been noted. Their experience has been recorded by one of them (Miss Vida Kirkcaldie) with spirit and insight.

Just a year from the outbreak of war . . . the first detachment of masseuses left Australia. One half the number went straight to England, the other disembarked at Suez and were distributed among the various Australian hospitals in Egypt.

In a very short time we had almost more work than we knew how to cope with . . . the first six weeks or so were hopelessly depressing—the majority of cases were of so long standing, it was practically impossible to see any result from our labours. . . . Numbers of the men who came to us were only receiving massage treatment. Their wounds had healed and it was now a question of getting tone back into the injured muscles, of loosening scar tissues, of working stiff joints, of gradually breaking down adhesions, etc. There was an infinite variety in our work—cases of actual nerve lesion, where we could not hope to do more than keep the limb in fairly good condition pending operation, cases where injury to the nerve was less severe, and in which we were able to coax

back movement to the paralysed muscles, cases of fracture, simple and compound; shell shock, neuritis, insomnia, synovitis knee, hysterical paralysis, which generally responded to suggestion and re-educative exercises—we had a bit of everything.

On our arrival in Egypt, we found no provision whatever had been made for us in the way of equipment . . . we in the end succeeded in getting a complete and efficient, if somewhat improvised stock of equipment, proudly headed by our Multostat.

It was while at Heliopolis that we started that most fascinating branch of our work of which we were to do so much later in England—*vis.*, the treatment of open wounds by ionization with zinc or copper. Both in Egypt and England we treated all manner of cases—sluggish wounds which refused to heal and of size varying from surfaces smaller than a 3d. bit to those many inches in diameter often as old as six months, pressure sores, sinuses, sores from frost bite, etc.

Only partial figures are available to indicate the very extensive therapeutic activities of the service. A report by Staff-Sergeant Slaweski, who worked at No. 1 A.G.H., says that the masseurs

"report doing thirty to forty cases a day". The work, at first uncontrolled by record or checking, was later, *at the request of the masseurs*, more definitely controlled by the medical officers. There appears to have been, however, little direct responsibility or control by medical officers. "Massage" was ordered with little regard to the precise object aimed at. The work was carried out with enthusiasm and personal conscientiousness by the masseurs. No report of results can be found. A memorandum by the sergeant, however, notes that "most satisfactory results were obtained in partial paralysis from shell-shock. Many of these were practically without movement in any part of the body: after a short period of treatment, they were able to get up and walk about." Rheumatism is noted as a very common complaint: an application for an apparatus for super-heated air was turned down.

In the course of his first tour of inspection of the A.I.F. at the end of 1915 Surgeon-General Fetherston found a wide clinical field and great demand for "massage" and other forms of physical therapy in the Australian General Hospitals, Auxiliaries, and in particular in the Convalescent Camps and Depots. "By far the greater number of men requiring massage" he found to be in the latter which, he reported to the Minister, "are not suitable for women workers". He concluded that the bulk of the work was more fitted for male than for female operators.

**The tour of
the Australian
D.G.M.S., 1915**

In order to train personnel capable of providing some form of continuous treatment to invalids on the transports to Australia, he instituted in the General Hospitals "classes" for training men to serve as "rubbers". He initiated thereby a precedent which, exploited later on a large scale, became a cause of acrimonious debate among both medical officers and the qualified practitioners of massage.

THE WESTERN FRONT

The reorganisation of the Australian Imperial Force and formation of an administrative headquarters had no immediate influence on the position of the Massage Service. Early in 1916 it will be recalled the **Reorganisation of the A.I.F.** Infantry formations of the A.I.F. with Nos. 1 and 2 General Hospitals left for France and medical Administrative Headquarters for England, together with the Military Convalescent Depot ("Base Details"). No. 3 Australian General Hospital together with the medical convalescent auxiliaries remained for a time in Egypt with the Light Horse. The personnel of the Massage Service was distributed among these units for the Eastern and Western Fronts with no very definite purpose in view. Each of the General Hospitals was accompanied by the members of the Massage Service, both masseurs and masseuses, who had worked with or been allotted to them. Those members of the service who had already been sent to England were working in the Australian Convalescent Hospital, Harefield, which now became No. 1 Auxiliary.⁹

In July 1916, there was completed the arrangement by which Australian convalescents, when leaving British hospitals in the United Kingdom, were concentrated in three Australian auxiliaries. At the same time the greater part of the Australian massage personnel was withdrawn from the Australian General Hospitals in France and concentrated in England, either in Auxiliaries or in Command Depots. Masseuses went chiefly in the former, masseurs in the latter.¹⁰

⁹ In 1915 two voluntary workers were attached to the Australian Convalescent Depot at Harefield and worked there throughout the war.

¹⁰ It may be noted here that a medical officer (Capt. A. Syme Johnson) who in the last year of the war was detailed by the D.M.S., A.I.F., to report on the whole service of orthopaedic and physio-therapy treatment gave as his opinion that the practitioners in physio-therapy should have remained with these units in France, and additional personnel been obtained for England.

It is convenient here before describing the work done by the members of the service to follow *the administrative history* of the service, and in particular the course of the debates on the subject of its *status* within the Australian Army Medical Service.

As already explained, in October 1915 a definite Army Service of Massage had been created by the Australian Government and a detachment of trained exponents, male and female, was sent to the A.I.F.¹¹

On 24th June 1916, Surgeon-General Howse was asked by

¹¹ It will perhaps be of interest to indicate the course taken in the British Army Massage Service.

In Great Britain the employment of masseuses in the Army was initiated by the action of Mr. and Mrs. Almeric Paget, who in August 1914 organised a service of 50 qualified masseuses, under the personal control and supervision of a committee. Its services were accepted by the military authorities as the "Almeric Paget Massage Corps". It commenced work in the Territorial Force General Hospitals in September, 1914. The cost of the service was at first met by private benevolence.

"In December, 1916, it [the Almeric Paget Massage Corps] was given the title of the Almeric Paget *Military Massage Corps*, and in May, 1917, it became a service paid by the War Office for duty in military hospitals, convalescent hospitals and command depots. In July, 1917, the employment of its members was authorised in hospitals overseas. The rate of pay for a masseuse was fixed at £2/10/0 weekly without accommodation, the head masseuse receiving £3 if ten or more were employed in any one hospital.

"These arrangements continued until January, 1919, when a definite military massage service was organised, with its headquarters at the War Office. The members were placed in two categories, A and B, according to qualifications. In each category there were three classes—mobile, immobile, and part-time. The grades were head masseur or masseuse, senior masseur or masseuse, and masseur or masseuse. They were prescribed a uniform with the letters M.M.S. in white on a blue ground on the hatband, and grade badges on the shoulder straps. Altogether 3,388 masseurs and masseuses were enrolled during the war, and 2,000 were at work on the day the Armistice was signed. Approximately, the number employed after the Almeric Paget Massage Corps became the recognised source of supplying massage personnel for military service was in January of each year, 900 in 1916, 1,200 in 1917, 1,500 in 1918, 2,000 in 1919. During 1919 the numbers were necessarily much reduced, and at the end of the year the number was 600." (*British Medical History*, Vol. I, p. 143.)

In the History of the Horton War Hospital, Epsom, Col. Lord, the Commanding Officer, says:

"The electro-therapeutic department and massage corps were indispensable adjuncts to the work of the surgeons. . . . I always resisted the creation of a special massage department, my line of argument being that in a general hospital such treatment should not be severed from the immediate supervision of the sister and medical officer in charge of the case. There was also less likelihood of the case being lost sight of and retained in hospital for this purpose only. Army Council Instruction No. 65 of 1919 led to the creation of the Military Massage Service. A unit was established here consisting of one head masseuse and fifteen masseuses."

Colonel Carbery in the *New Zealand Medical History* states:

"At the New Zealand General Hospital at Hornchurch the most important change in 1918 was the opening of a school of Massage. All through 1918 there had been an acute shortage of trained masseuses. To meet this the D.M.S. instituted a course of training at Hornchurch in conformity with I.S.T.M. standards. Many of the candidates trained at Hornchurch were able to attain the I.S.T.M. certificate, and in this way our future requirements were provided for."

In Canada masseurs did not hold commissioned rank. They were, however, represented on the staff of the D.G.M.S.

the Defence Department¹² to furnish recommendations regarding a definite establishment and status for masseurs on service with the A.I.F. abroad. In reply Surgeon-General Howse gave the following as his considered opinion—

I am of the opinion that the existing arrangement which has worked very well is the most satisfactory. That is, that masseurs and masseuses be attached for duty to the hospitals, convalescent depots, etc. The number so attached may be varied from time to time according to the number of cases requiring massage. The rank to remain as at present—masseurs, staff-sergeant; and masseuses, staff nurse. The following allotment of masseurs and masseuses is based on the results of the work in Egypt and elsewhere:

General Hospital	.. .. .	up to 520 beds—2 male or female
"	"	" " 1,040 " —4 " " "
Convalescent Hospital or Command		
Depot	.. .. .	" " 520 " —1 " " "
"	" " " " "	" " 1,040 " —2 " " "

and thereafter 1 per additional 500 patients. Ships conveying invalids per 500 patients 2.

In the meantime however before receipt of this opinion, the Australian Defence Department had provided in the establishment for the new Australian "Double" General Hospital, then being raised for service abroad, a massage service of 1 (honorary) lieutenant and 2 staff-sergeant masseurs. In June 1916 Administrative Headquarters in London was cabled as follows:

Information is desired as to giving some or all masseurs in A.I.F. commissioned rank. . . . Also number required both male and female.

To this the D.M.S., A.I.F., General Howse, replied:

Strongly oppose commissioned rank being given to any masseur, absolutely unnecessary, only waste of money as far as A.I.F. concerned. None required.

On receipt of this opinion the inclusion of a massage staff with No. 14 A.G.H. was cancelled and the question of com-

¹² Actuated it would seem in part at least by a letter given prominence in the Australian Press early in the year wherein a staff-sergeant masseur (B. Slaweski) at No. 1 A.G.H. gave an account of the work done by himself and his colleagues. In the course of the letter he pointed out that, since there was no massage service in the A.I.F. and thus no special gradation list, there could be no "promotions"; and that in the A.I.F. moreover, promotion to commissioned rank was not provided for.

missioned rank for masseurs in the A.I.F. was for the time dropped.

General Fetherston informed Howse that there were accordingly included in the staff of No. 14 A.G.H. only

several men who had acted as rubbers in our hospitals here for 10 or 12 months . . . they are not masseurs, but have done good work, but are not competent to work independently.

At the end of June 1916 the distribution of the masseuses with the A.I.F. was so far as can be ascertained as follows:

No. 1 A.G.H. . . 2	No. 1 Aux. Hospl.		
No. 2 A.G.H. . . 4	(and 2 voluntary) 5	On Reserve . . . 2	
No. 3 A.G.H. . . 2	No. 2 Aux. Hospl. 1	On Transport . . 2	
Red Cross Hospital, Cheltenham . . 1	No. 3 Aux. Hospl. 2	Wandsworth . . 1	
		Total . . . 22	

The above represents the allocation of masseuses at the beginning of the Somme battles.

In the middle of 1916, as has already been noted, the members of the service were concentrated in England.

At the end of 1917, probably influenced by expressions of public opinion in Australia, as well as by developments in the system of invaliding,¹³ the D.M.S., A.I.F.

Changed outlook on physical therapy initiated an enquiry into the position in the Australian medical units and convalescent depôts in regard to the "massage" service.

This was followed in January 1918 by a more exact enquiry covering also the whole work of the service, the views of the commanding officers as to its importance, and the adequacy of the staff provided.

The commanding officers of the Australian General Hospitals in France were either content to make "nil" reports or to express themselves as satisfied with the service of a single masseur; but the C.O's of the Australian Auxiliaries were insistent that their staff should not be decreased and might with advantage be augmented. The situation in the Australian units and convalescent depôts during 1916-18 as nearly as can be ascertained is shown in the appended table.

¹³ See Chap. xiii.

NUMBERS OF MASSEURS AND MASSEUSES EMPLOYED IN THE A.I.F.

	Australian General Hospitals			In British Hospitals.	Australian Auxiliary Hospitals			Officers' and Nurses' Convalescent Homes including A.A.H.	Command Depots.				Le Havre	Transport Duty	Total
	1	2	3		1	2	3		1	2	3	4			
<i>June, 1916.</i>															
Masseurs (Registered) ..	1	?	?		?	?	?		?	2	?	?			
Masseurs (Locally trained) ..															
Masseuses (A.I.F.) ..	2	4	2	4†	6	2								2*	22
Masseuses (Other than A.I.F.)															2
<i>December, 1917.</i>															
Masseurs (Registered) ..	Nil	Nil	Nil		1				Number unascertainable					Num-	2
Masseurs (Locally trained) ..	Nil	Nil	Nil		4									ber	3
Masseuses (A.I.F.) ..	Nil	Nil	Nil		2									un-	10 ¹⁴
Masseuses (Other than A.I.F.)	Nil	Nil	Nil					3						stated	7
<i>June, 1918.</i>															
Masseurs (Registered) ..		1	1		1				1	3	1	1		Num-	7
Masseurs (Locally trained) ..		1	1		4				4	10	11	9		ber	42
Trainees for Transport Duty										13				un-	13
Masseuses (A.I.F.) ..					4									stated	9
Masseuses (Other than A.I.F.)					2			3							5
<i>October, 1918.</i>															
Masseurs (Registered) ..	Nil	1	Nil		7				1	4	Nil	1	2	Num-	8
Masseurs (Locally trained) ..	Nil	1	Nil						12	7		17		ber	53
Trainees for Transport Duty										51				un-	51
Masseuses (A.I.F.) ..														stated	2
Masseuses (Other than A.I.F.)								2							

* Shown merely as "on transport".

† 2 in British hospitals, 2 on reserve
 ‡ Of the 22 masseuses shown in the 1916 returns 12 had been returned to Australia before the end of 1917 either on duty or for discharge.

The administrative history of the service in these years was largely determined (1) by the views of the D.M.S., A.I.F. (Surgeon-General Howse) on the clinical significance of physio-therapy *in relation to the specific medical problems of the A.I.F.*; (2) by his personal opinion regarding the military status proper to the members of the service.

The first was governed first and foremost by the requirements of the "six months' policy"; but was also influenced by strong personal views as to the value of massage and electricity as commonly employed.

On the matter of *status* his attitude conformed with his views as to the value of this specialty to the A.I.F. In 1918 the Australian D.G.M.S., General Fetherston, undertook a complete inspection of the Australian Medical Services overseas. At No. 2 Command Depot he was interviewed by the senior masseur (Staff-Sergeant W. Leeming) who asked that, as in Australia, in the A.I.F., some masseurs should be given commissioned rank. Howse, who had been already instructed that similar rank should be given to some pharmacists, opposed each proposal as a waste of money—an attitude in which he was entirely sincere. General Birdwood accordingly wrote to the Secretary for Defence that (in the case of the masseurs—the other was already decided) he agreed with his D.M.S. Fetherston, on the other hand, on returning to Australia, reported to the Minister:

The massage service was seething with discontent. The cause of the complaint was the refusal of the G.O.C., A.I.F., to grant any commissions to masseurs. Some masseurs in Australia hold commissions, and the men overseas feel that they are being unfairly dealt with. I am of the same opinion, and forwarded a report to the G.O.C., A.I.F., recommending that he should grant commissions to some of the masseurs, as was done in Australia. Another cause of complaint was that the female members (masseuses) were not allowed to wear badges of rank as nurses do. This cannot, in my opinion, be granted, as if masseuses are given relative rank of officers, then all males must be similarly treated, otherwise there would be still further trouble and dissatisfaction. . . . Shortly before my arrival a system had been adopted and brought into force which will ensure reasonable attention to cases needing massage treatment during the homeward voyage, and thus do away with many of the complaints received in Australia upon the subject. I feel that the masseurs deserve recognition on account

of their good work, and recommend that commissions be granted on the same conditions as in Australia.

There the matter rested; the principle which, in the opinion of the present writer, might fairly and wisely govern the decision in such issues has already been stated and is referred to later in this chapter.

PHYSIO-THERAPY AT THE AUXILIARIES, 1916-19

The work of the Australian Army Service of Massage divides itself into two spheres, differentiated both technically and militarily, and—as it happens—the one the field mainly of the women, the other of the men.

1. The Australian Auxiliary Hospitals.

2. The Australian Command Depots.

By the middle of 1918 the distribution of masseurs, masseuses and locally trained men was as follows—

	Masseurs.	Masseuses	Locally trained
No. 1 A.G.H. ..	—	—	—
No. 2 A.G.H. ..	1	—	1
No. 3 A.G.H. ..	—	—	1
No. 1 A.A.H. ..		4 + 2 not A.I.F.	1
No. 2 A.A.H. ..			4
No. 3 A.A.H. ..	1	5	1
Cobham Hall (Officers) ..		1 not A.I.F.	
Nos. 4 & 5 Aux. Hpl.		2 not A.I.F.	
No. 1 Command Depot	1		4
No. 2 Command Depot	3		23 (inc. 13 tpt. trainees)
No. 3 Command Depot	1		11
No. 4 Command Depot			9
	7	9 + 5	55

The work of the Australian Massage Service and of physical therapy in general in the western theatre reflected General Howse's desire to implement the "six months' policy"; that is to say, in a combined process of movement and treatment the

emphasis was on movement. In men of the "invalid" categories reparative treatment in England was practically confined to the brief period of their stay in the Australian "Auxiliaries". Thereafter, the purpose of movement was dominant, and any subsequent halts, as in the Command Depots, and the hospital ship or transport, were little more than stagings. Moreover, General Howse was temperamentally incapable of incurring any expense for which he could see no worthwhile "return", and he was very strongly convinced that much of the technique, and most of the paraphernalia, of "physical therapy" was waste of money and of time, or worse. The result of these two factors on the service of physio-therapy was to create a dual system. In the Auxiliary Hospitals, the fully trained and registered members of the Massage Service were employed on work much on the lines of a General Hospital in peace, the therapeutic agents employed being of the more sophisticated type. The technique of massage was based on accepted theory, which derived, in some sort at least, from anatomy and physiology; electricity was applied with discrimination, in accord with current theories of electro-therapeutics, for diagnosis and muscle-nerve regeneration. Diathermy, radiant heat, light—all were used—in principle at least—under the direction of the medical officer in charge of the case, and the general direction of a "specialist"—at No. 1, the radiologist, Lieut.-Colonel C. E. Dennis.

There is ample evidence that the services rendered by the personnel of the Service¹⁵ were fully up to the highest standard at that time achieved or aimed at. That from a strictly therapeutic standpoint in the major spheres of action—"massage" and "electro-therapy" (both galvanic and faradic)—they were directed along lines valueless or even harmful in some of their final results, is to be attributed to the medical profession, not to the lay executive technicians of the specialty. Both *massage* and *electro-therapy* were called on to produce physiological effects which they were incapable of achieving; while psychologically they tended strongly to produce a mental condition

¹⁵ In the opinion of the writer it is to be regarded as a default which savours of meanness that, in the case of the female staff, the very high ideal of devotion to their accepted duty and a standard of performance that in some respects put the medical profession to shame was not, so far as can be ascertained, "rewarded" by one single "honour".

which was the exact reverse of that conducing to bring about—or renew—*mens sana in corpore sano*. Patient and operator were alike soothed into passivity of faith and hope; whereas the real need for the man, as also for his musculo-nervous apparatus, was vigorous self-help and active endeavour. For the surgeon the blind resort to passive treatment was even more demoralising, leading to *laissez faire* and clinical indolence.

In the circumstances of the Auxiliaries these untoward effects were not seriously in evidence. Most of the patients were in an early stage of convalescence, in which *rest* rather than stimulation and action were still the prime necessities. They were moreover largely birds of passage; their therapeutic as well as their nostalgic goal was their homeland, Australia; the one supreme purpose in view was to get them there, when the physiological and psychological moment for active intervention would arrive. It was in Australia (as will be seen later) that *laissez faire* and passive treatment were permitted to “substitute” themselves for intelligent exploitation of the resources of reparative intervention that had been built up through the thought and labour of the greatest minds in “reparative” surgery, from Hunter to Robert Jones.

In the Australian Auxiliaries there is evidence also of the positive and scientific outlook that had begun to inform the surgical mind throughout the nations at war. In all three hospitals, as has been seen already, a high grade of scientific initiative inspired the medical officers responsible for the brief interlude of static treatment that intervened between healing in the British hospitals and the turmoil of classification and movement in the Command Depots or the absolute “mark time” of the sea transport. One of these campaigns of treatment, especially germane to the subject of this chapter, has been recorded in the article by Major Newton on *Nerve Suture*—in *Chapter VI*.

At Harefield complete and exact records were kept of the
No. 1 A.A.H. work done, and it is epitomised below.¹⁶

¹⁶ For these and for the admirable account of the development of the service here, and of the nature of the work done, the author is indebted to Miss Josephine Jennings, who had charge of the electrical therapy ward at Harefield, from 1916 to 1918.

TREATMENTS AND TESTS CARRIED OUT IN THE MESSAGE
AND ELECTRICAL TREATMENT WARDS OF NO. 1 A.A.H.,
1916-19.

Nature of treatment.	1916.	1917.	1918.	1919 (1 month).	Total.
Electric treatment, including ionisation	6,979	9,598	12,219	365	29,161
Massage and hot air	24,246	27,735	22,911	500	75,392
	31,225	37,334	35,130	865	104,553

The attitude of the Officer in Command during the period of most intense activity is expressed in the following:¹⁷

I will say without reserve that the work of the Massage Department at Harefield was quite exceptionally good; that there was unusually close sympathy and co-operation between the surgeons (notably Shaw and Col. Dennis, radiological and physio-therapeutic specialist); and that failing this the operative surgery of joints, muscles, nerves, septic scars, etc., would not have been nearly so successful as they were. Considering that we were working under the disadvantage of having to send cases on to Command Depots, Weymouth, and return to Australia for further treatment—that we could not hold cases long enough and that often, even nerve cases had to be sent on much too soon—the results we saw in those men were very wonderful. In weeks with us they did more good than they had in months previous to their coming to us, and in this the Electrical and Massage Department had their very large share.

Even if, as is indeed suggested, this must be held to relate to conditions (in wounds) that should not have been permitted to develop, it is impossible to disregard a statement so definite and authoritative.

The work at the other two Auxiliaries was akin to that described of No. 1. The following is taken from the reply of the commanding officer of No. 3 A.A.H. to the enquiry initiated by the D.M.S. referred to above.

No. 3 A.A.H. The staff are working excellently and efficiently, and there is every reason to be satisfied with the amount and quality of the work done.

For some time past, ever since congestion in English hospitals demanded that cases be passed through this hospital in greater numbers and at a greater rate, the number of cases available for treatment has been many more than the staff could possibly undertake. Circumstances have thus led us to limit the cases treated here to two classes:

(a) Those for whom massage and electrical treatment were

¹⁷ Memo. by Col. C. Yeatman, to the D.M.S.

necessary for a few days in order to clear up diagnosis or prognosis for purposes of "Boarding or Operation".

- (b) Those whose condition demands that they be held here for further treatment, and to whom massage is given as an adjunct to such treatment.

It is thus apparent that only a fraction of the men passing through this hospital, who need it, receive treatment in the massage ward.

The others are passed on as rapidly as may be to Command Depots where they receive it. No case ever remains in this hospital for massage only.

If this principle of selection of cases is adhered to, then the present staff is sufficient, when working at a maximum and not allowing for sickness or leave. I would suggest that one further operator be added to replace one transferred last month. I beg to draw your attention to the fact that several months ago the staff numbered 18 and even then was not underworked, and the fact that the present staff can carry on is entirely due to the selection of cases in classes (a) and (b) above.

The work of a masseur or masseuse is determined more by the number and class of case than by hours worked; 20 and 16 are the outside numbers which can be efficiently treated by man and woman respectively, beyond these figures they cease to do efficient work. Their whole time is spent in muscular effort of the forearm and more particularly the fingers, and these become very tired. If they continue to work overtime they become subject to an affection strictly comparable to "writer's cramp". One of our operators was boarded to Australia last July owing to this affection.

The hours of work daily commence at 8 a.m. for the staff-sergeant and 9 a.m. for the masseuses. The men usually finish off their cases about 3.30 p.m. and the masseuses half an hour later—the masseuses performing electrical work finish rather later.

While the hospital is dealing with so many patients, I am of the opinion that no alteration can be effected.

A large number of cases admitted to this hospital are recovering from disabilities which needed massage and allied treatment. In a great percentage of such cases no massage treatment has been received, consequently the recovery from the disabilities has been markedly delayed and the final results obtained are not as satisfactory as one should expect.¹⁸

While the views quoted above on the clinical questions involved are individual to the officer concerned, they represent, it is believed, the opinion of a majority of medical officers at the time.

At this unit an enthusiast in massage and electricity, Captain A. Syme Johnson, organised the department on special lines. Becoming acquainted with this work, early in January the

¹⁸ From a report by the C.O., No. 3 A.A.H. Dartford (Lieut.-Col. B. M. Sutherland), to D.M.S., Administrative H.Q., A.I.F., dated 10 Jan. 1918, re masseurs and masseuses in Australian Auxiliary Hospitals.

D.G.M.S. in Australia cabled A.I.F. Headquarters desiring the return of Captain Johnson to

"take charge of electrical massage and allied treatment of injured and wounded in Victoria. Before sailing give opportunity see as much work as possible in England, France. Two A.A.M.C. men to act as assistants also to be returned, men with experience to be sent."

After a tour of the Australian and British centres Captain Johnson left for Australia in February on this mission.

At No. 2 Auxiliary the work was largely confined to promoting nutrition in the tissue of amputation stumps. Records of the results observed are not available.

IN THE COMMAND DEPOTS

The other chief sphere of activity occupied by the personnel of the Australian "Massage" Service was that contained within the Command Depots. It presents a totally different picture, both military and professional. Here the treatment by masseurs was so completely part and parcel with that of the military events that it necessarily forms part of the problems of the Australian invalid in England, which are to be dealt with in *Chapter XIII*. There are however features of special interest in the experience for the physio-therapeutic specialist which cannot be passed over here.

The use of massage, and of "physical therapy" in general, in the Command (*i.e.* Convalescent) Depots was initiated by personnel of the Massage Service. In October, 1915, two of the staff-sergeant masseurs¹⁹ sent overseas by the Australian Department of Defence began work at the Australian Base Depot, Weymouth, under the S.M.O. Captain (later Colonel) D. M. McWhae.²⁰ From the outset of his long experience in Command Depot work this enterprising and energetic officer was constantly on the lookout for means to expedite the stage of functional recovery after wounding or sickness, or to promote further intervention by the orthopaedic surgeon. With this dual object he identified himself fully with the aims and efforts of the exponents of physio-therapy, both medical and lay. Under him an elaborate system of physical treatment and remedial exercises was gradually developed in the several depots, closely

¹⁹ Staff-Sergeants W. Leeming and A. P. Ahern.

²⁰ See Vol. I, pp. 505, 508.

adapted to the ends to be served—respectively, *return to the front* (or to some form of “B” Class service overseas), or *repatriation as invalids to Australia*. The conditions of work at Weymouth were at first crude in the extreme. An interesting description of the pioneer efforts, written from the point of view of the Massage Service by a thoughtful and ingenuous narrator, Sergeant Leeming, has been found most useful. As with so much else in the Australian war effort, the problem of physio-therapeutic treatment in the depots became a major issue with the crisis produced at the end of 1916 by the Battle of the Somme. An account of it by the officer most concerned, Colonel McWhae, is given here practically unchanged:

From the commencement of the depots to the middle of 1916, a large number of disabilities following gunshot wounds (*e.g.* stiff limbs, contractures, etc.) were treated in the Massage Department of the depots by massage and active and passive movement. Qualified masseurs were available, but in small numbers, and it was necessary for them, even at this early stage, to train suitable home service personnel to assist them.

From the middle of 1916 onwards, however, much larger numbers of such disabilities arrived at the depots. The numbers became far too great for the Massage Staff to deal with. Suitable physical training instructors were therefore selected and sent to the British Orthopaedic Hospital, Shepherds Bush, and to one or two other British hospitals, for instruction in the methods of remedial gymnastic treatment. In November, 1916, when these trained instructors reported back for duty, a remedial gymnastic department was opened at Weymouth. A few months prior to this, in August, 1916, electrical treatment for injured nerves and other disabilities had also been commenced.

As the other Command Depots were formed, they were also fitted out with massage and remedial gymnastic departments. The apparatus and equipment for these departments was supplied by the Australian Red Cross. The arrangements, however, for dealing with orthopaedic patients during the first year after the transfer of the A.I.F. to France were not satisfactory. But it must be remembered that the increase in the influx of orthopaedic patients was insidious and that it was not until the early months of 1917 that it began to assume large proportions. The treatment of the *temporarily* unfit men in Nos. 1, 3 and 4 Command Depots by remedial gymnastic methods and massage was quite satisfactory; but in No. 2 Command Depot (*i.e.* Weymouth—for invalided men, to be sent to Australia) although the personnel of these departments worked as hard as they could, they could not cope with the task and no arrangements were in existence for continuing the treatment of such patients during the return journey to Australia.

The Australian wounded arrived at the Australian Auxiliary Hospitals and Command Depots from the British General Hospitals and Red Cross Hospitals in various stages of repair and disrepair. Many came with splints and showing every sign of careful and skilled treatment. Many came without splints, these having been removed so as not to deplete the stock of the hospital. Others came showing more signs of

sympathy than of skill. Unsplinted cases of foot-drop and wrist-drop with resulting contractures were common.

There were at the Australian Auxiliary Hospitals well equipped physio-therapy departments and a well trained staff under keen medical officers. Patients would be sent to these officers for diagnosis and treatment, but often they would find that after a few days' treatment many of the patients had vanished, having departed to the Command Depots with their foot-drop, wrist-drop, or other deformities, and with insufficient splints or without splints at all.

This was in accordance with the policy of the A.I.F. that soldiers who were not likely to be fit for service within six months must be returned to Australia as rapidly as transports were available. The treatment of orthopaedic patients at this period therefore was conspicuous by its inefficiency, and caused abuse in all quarters. The Australian Auxiliary Hospitals abused the British hospitals in England, the Command Depots abused the Auxiliary Hospitals, the General Hospitals in Australia abused the A.I.F. overseas, and all combined to abuse the rapid return of many of the orthopaedic cases to Australia.

The real cause of the inefficiency of orthopaedic treatment at this period can, however, be traced to the fact that there were few medical officers in the British hospitals who knew anything of orthopaedics and still fewer in the A.I.F.

In October, 1917, the situation was grappled with seriously.

Although Colonel McWhae's report gives no indication of this, it was through his own vigour that the new era was initiated. Previously "remedial" gymnastic and manipulative treatment had been given only to "B1" men (those temporarily unfit). He arranged for it to be given to all those soldiers boarded for return to Australia who were thought likely to be benefited by it.²¹ For the requisite staff McWhae put forward in August 1917 the following proposal:

²¹ The proposal drawn up for Gen Howse's approval was:

"All soldiers with stiffness of joints, contracture of muscles or tendons and similar lesions will receive remedial gymnastic treatment, providing no acute inflammation, oedema or unhealed wounds (except in special selected cases of the latter) are present *e.g.* Stiffness of the shoulder, elbow or wrist, limitation of extension of the elbow, limitation of supination and pronation of the forearm, stiffness of the wrist, hand or fingers with contractures and loss of handgrip, stiffness of the knee whether accompanied or not by a flexion, contracture, stiffness or limited mobility of the ankle, contracture of the calf muscles with resultant foot-drop, deformities of the foot, etc.

"Soldiers requiring general exercises will not be included in this class. Such soldiers will be treated in a general class at Westham Camp. All special remedial treatment will be given at Monte Video Camp."

A special staff was recommended for 500 and for 1,000 "cases", that proposed for 500 to consist of 1 warrant officer, 3 staff-sergeants (1 "C" Class), 3 sergeants (all "C" Class) and 1 corporal ("C" Class). The nucleus for this was to be taken from existing staff and the necessary additions obtained from "C" class men at No. 2 Command Depot.

Space for dealing with 1,000 cases was already available in the gymnasium. This was to be fitted with apparatus (for 500 cases) as follows—1 set "Abecot" Zanders machines, 3 plinths (2 high, 1 low), 3 cycle exercisers, 2 rowing machines, 1 nautical wheel, 1 wrist machine, 1 slide ladder with exercisers, spring and grip dumbbells and wall exercisers.

1. That a staff be trained on the following lines:

- (a) A medical officer be sent to the Orthopaedic Military Hospital, Shepherds Bush, for a tour of duty.
- (b) A skilled workman or workmen from No. 2 Command Depot, Weymouth, be also sent to this hospital for instruction in splint making, as carried out in the workshops there.
- (c) That the surgical bootmaker at present at No. 2 Command Depot, Weymouth, be also sent to the workshops at the Orthopaedic Hospital for instruction in the methods in use there.
- (d) The staff-sergeant in charge of electrical and massage treatment at No. 2 Command Depot receive instruction at the orthopaedic hospital in the use of Bristowe's Coils.

2. *Duties:*

The medical officer having been trained in orthopaedic work will—

- (a) Inspect all soldiers reporting at No. 2 Command Depot.
- (b) Return to hospital all soldiers who require such operative treatment as nerve suture.
- (c) Do any necessary minor operative treatment, such as division of tendons and rectification of deformities under anaesthetics.
- (d) See that all necessary mechanical treatment to reduce deformities is carried out.
- (e) Fit any splint necessary to overcome deformities, e.g. plaster of Paris, Jones' malleable iron splints, foot-drop and wrist-drop splints.
- (f) Classify soldiers for the following treatment if they require it: Electrical, massage, remedial gymnastics either individual or general.

3. No. 2 Command Depot to be entirely self-contained, and to provide all necessary splints, boots and mechanical apparatus. Bristowe's method of using electricity to be employed.

4. All soldiers with stiffness of joints, contractures of muscles or tendons or similar lesions will receive remedial gymnastic treatment, provided there is no contra indication to its employment.

Additional apparatus, viz., slanting ladders and spar plank, wrist rollers, etc., will be required.

I would also recommend that any necessary orthopaedic measures be continued on the invalid transports on which soldiers are returned to Australia, but that no case other than those mentioned in para. 2 (b) be delayed in England for this purpose.

I do not recommend that soldiers fit to travel to Australia be retained in England for orthopaedic treatment, because in these, the will to get well would be absent if they knew that their return to Australia had been delayed for this purpose.

It would be advisable for the medical officers returning on invalid transports to be present at Weymouth for a week or two prior to the departure of the transport, so that they may familiarise themselves with any treatment required by the soldiers who will be under their care on the voyage.

In addition to the Massage Staff, which is now being placed on the transports, I would recommend that at least 2 soldiers trained in

remedial gymnastic treatment at Weymouth be also put on each transport with a few gymnastic appliances, e.g.:

For 100 Cases. 2 plinths (1 high, 1 low), 1 cycle exerciser, 1 rowing machine, 6 pairs grip dumbbells and 6 Terry spring spirals.

It was indeed obvious that the only place where many of the (Australian) orthopaedic cases stayed in England sufficiently long to receive effective physical treatment was at this Weymouth Depot. Colonel McWhae says:

Although great numbers of patients requiring a certain amount of orthopaedic treatment were sent to Nos. 1, 3 and 4 Command Depots the majority of them were not so seriously wounded and were adequately dealt with by massage and remedial gymnastic treatment. It was found that quite a large number of these patients required more treatment than this, but such patients were obviously wrongly classified and were not going to be fit for service again for prolonged periods. These patients were therefore transferred to No. 2 Command Depot, Weymouth, where they could be given any treatment they needed.

The first step in the establishment of a more efficient orthopaedic department at No. 2 Command Depot was the appointment in September, 1917, of two efficient medical officers, one in charge of the electro-therapeutic and massage work and the orthopaedic department generally, and one in charge of the remedial gymnastic department.²² Two skilled tradesmen of the Home Service class were selected and sent to the orthopaedic hospital at Shepherds Bush for instruction in splint making and surgical bootmaking and commenced work at No. 2 Command Depot early in October, 1917. At the same time the orthopaedic department was thoroughly equipped with additional electro-therapeutic and other apparatus to deal with large numbers of cases, although for a period there was some trouble with the electric current until a separate motor generator was installed.

Finally the great importance of arranging for the adequate treatment of orthopaedic cases while returning on transports to Australia was realised and on 5th October 1917, there were placed for the first time on a ship remedial gymnastic apparatus and a staff of trained instructors to treat cases on the journey.

Great numbers of orthopaedic cases were sent back, but the concern of the A.I.F. for them ended when they were landed in Australia. It was considered, however, that a carefully prepared clinical history especially of nerve injuries would be of great value to medical officers in Australia. About the middle of 1918 with much care an orthopaedic case sheet was drawn up, based largely on the one in use in the Alder Hay Orthopaedic Hospital in Liverpool. This sheet was prepared with headings for history, operations, associated lesions (including X-ray reports on bone injuries), range of movement (except in nerve injuries), neurological condition (date of examination, voluntary power, sensory loss, faradic response, galvanic response, reaction of degeneration and threshold of excitation).

²² These duties were soon combined. Maj. C. A. Stewart was in charge during 1917, Maj. E. B. Thomas in 1918.

Colonel McWhae concludes: "The information required on this case sheet, so far as it was possible to obtain it, was sent with orthopaedic patients returned to Australia. Quite a degree of unnecessary thought and work might have been obviated if it had been possible to foresee that *these carefully prepared case sheets were destined to enter the Base Records Department in Australia and never leave it* and so were never available for the information of medical officers in General Hospitals in Australia."

It is clear that the recognition of the fact that "massage" and the other forms of "physical therapy" must be systematically provided in the Command Depots came by reason of the arrival in the depots of crowds of patients whose immediate functional recovery and return to duty seemed to be impeded, or their further surgical treatment prejudiced, for want of some active assistance such as massage and electricity were supposed to supply.

It is here indeed in the experience of the Command Depots that we find presented most clearly the hard facts of "the case for physical therapy" in this war. Emphatically it was the demand for treatment which created the supply of physical therapy and physical therapists, rather than *vice versa*. And if we would seek the ultimate clinical source of the curiously insistent demand for "massage and electricity" we may discern it—and a useful "lesson"—in the fact that at this time it was understood (though too late in the war to be of material service) that "orthopaedic" and "remedial" treatment begins with first-aid, and that to be consistently successful the end-point of treatment must be a subconscious purpose throughout the entire course of evacuation, from "first-aid in the field" to the re-absorption of the soldier into civil life.

The outstanding feature of the practice in the Command Depots was the increasing recognition of the advantage of exploiting voluntary powers by *re-education* in the maintenance of nutrition and re-attainment of functional efficiency rather than by passive *manipulations and movements*. Manipulation and electrical "stimulation" of muscles and nerves, and the "passive movement" of joints, the exploitation of light waves, of heat waves, of cataphoresis and of diathermic transformation, merged

The outstanding feature

gradually with the wider concept and practice of "remedial exercises", "remedial training" and "games" leading to physical and functional "re-instatement". Here the history of the A.I.F. foreshadowed the history of present-day principles and practice in physio-therapy.

Physio-therapeutic work was carried out on the sea voyage to Australia under three arrangements more or less distinct.

**The sea
transport
service**

The staff of the hospital ships included members of the Australian Message Service, and here the treatment given was the continuation of that in the Auxiliaries.

On the invalid carriers special provision, peculiar it would seem to the Australian force, was organised partly from the A.I.F. end, with its special transport staff from the depots, partly from Australia, with the "sea transport sections". Even more than in the Command Depots this sea transport service was wholly designed as a mark-time procedure between treatment in England and in Australia. It was in no sense a phase of systematic treatment and belongs properly to the problem of movements of invalids dealt with in the special chapter devoted to this subject (*Chapter XIV*).

PHYSIO-THERAPEUTIC SERVICE IN AUSTRALIA

The application of physio-therapy to invalided soldiers in Australia is matter for a later chapter, but the development there of the Message Service may here be epitomised. In October 1917 the establishment of the Australian Message Reserve was amended to comprise 6 lieutenants, 63 staff-sergeants, 23 male assistants with rank of corporal, and 81 masseuses—a total of 175 distributed between the six Military Districts.

In 1919 the following order was promulgated:

The Army Message Service forms part of the A.A.M.C. Reserve. Such staff as is considered necessary will be employed as provided for in the authorised establishment for the military hospitals concerned.

The message staff in each Military District will be under the control of the District Physio-therapist, who will be a medical officer nominated by the District Commandant and approved by the D.G.M.S.

Promotion to the rank of honorary lieutenant will be submitted to

the D.G.M.S. For this promotion special qualifications for the position must be held, and appointments will be made only to hospitals with a Physio-therapeutical Department.

A staff-sergeant masseur may be promoted to the rank of warrant officer on approval of the District Commandant.

Masseuses may on the approval of District P.M.O. receive increased pay as senior masseuses.

Civilian masseuses may (on approval of the District P.M.O.) be employed and receive increased pay as laid down in War Financial Regulations.

Before acceptance as masseur or masseuse, and before promotion or increase of pay are recommended, the District Senior Physio-therapist will certify that the masseur or masseuse is competent, and has produced evidence of having undergone a full and satisfactory course of instruction and training.

Masseurs and masseuses may be employed on a part-time basis.

This order definitely provided for the employment of honorary lieutenant masseurs in all hospitals, if authorised in establishments. The first occasion of such recognition was apparently when the establishment of No. 5 A.G.H. was amended to include a fully commissioned masseur.²³

Thus physical therapy in Australia developed on lines materially different from those followed in the A.I.F. This was due to two factors. First, the outlook differed. That of the A.I.F. was of necessity *dynamic*—the injured soldier must be ever on the move, either to recovery and return to the front, or to an invalid category and repatriation.

In Australia, until comparatively late in the war, the attitude toward the war-damaged man was essentially *static*. He had reached the final stage in evacuation, and there seemed no great urgency for pushing on vigorously with the further stages of repair of tissue, and re-creation of function. This attitude was wholly and fundamentally bad—its effects were devastating alike to the physical welfare of the soldier and to his *morale*; and were only less harmful to the clinical outlook of the medical service and medical profession. This unfortunate state of things was in a great part due to the restricted field of action into which the profession allowed itself to be manoeuvred.

It was only in the last year of the war that it was adequately

²³ See Military Order No. 486 of 1919.

realised that there can be no "mark-time" in treatment—the *case* must progress steadily and surely toward functional recovery, or the *man* will retrogress toward dependence and hospitalisation. Both in the A.I.F. and in Australia excessive reliance was placed on passive treatment rather than active self-help. In Australia this was carried to an extent which definitely militated against the interests of the war-damaged soldier.

No more poignant "history", no more searching "lesson" can be found in the terrible aftermath of the "Great" War than that which is revealed by a comprehensive and unbiassed study of the therapeutics of the "invalid" and the personal and social history of invalidity. Some account of these is attempted in later chapters.

Developments in the war and the subsequent evolution of physical therapy in civil medical practice suggest that the various technical specialties comprised in "physical therapy"²⁴ should be organised and administered as a combined service of physio-therapeutic "Aides". The relation of this service to the medical service would be identical with that of the pharmacists. The question of "commissioned" rank (or of its post-war equivalent) would be settled on the same basis as with other technical specialties, the criterion being the military importance and scientific and technical standard of the specialty. It may not be too much to hope that in a world "made safe for democracy" chiefly through the labours and sacrifices of uncommissioned members of the Army, the social differences between "commissioned" and "non-commissioned" rank may be so greatly reduced that the medical service may be quit of these unworthy quarrels.

It is clear that the claims of the Australasian Massage Association to recognition—as indicated by commissioned rank—were based on the fact that it was in effect the real expositor of the art of physio-therapy in all forms which did not involve the use of the knife, or of "rays" and other potentially lethal

²⁴ These would include massage, manipulation, muscular re-education, remedial gymnastics and exercises and economic re-training; electro-therapy, the therapeutic exploitation of heat and of the various rays and emanations—and such new discoveries and advances as may with profit (to the patient) be exploited in this way.

agents. This was in line with the general practice of the medical profession to devolute to subordinates the manual and menial techniques of the healing art—nursing, compounding, disinfecting, spectacle-making, limb-making, massage, electrical treatment, remedial exercises, health inspection and so forth. To an increasing extent, as medicine became more specialised and differentiated, the application of its art has been made the duty, and ultimately the sole prerogative, of a legally accredited association of executive personnel, whose allegiance is often strained as between its employer—the medical practitioner—and its own social prestige, and (it may be added) its concern for the science and art of its specialty. Hence the tears of many unhappy conflicts between the organised medical profession and the public; and hence the troubles of the Australian Army Service of Massage.

It is not possible to support by facts and figures conclusions for and against the value of physical therapy in the war experience of the A.I.F. or the peace experience of the Department of Repatriation, or to indicate its place in a complete system of military medical activities. Much depends on the answer to the question—what, in terms of physiology and clinical medicine, is the purpose which these forms of treatment are intended to serve?

The military value of physical therapy (If) by "massage" treatment (writes Colonel McWhae)²⁵ you mean the massage, remedial gymnastic, electro-therapeutic, re-educational and radiant heat treatment—called "Orthopaedic" treatment—given to the wounded after their discharge from hospital . . . (from) a *purely military point of view* my own opinion is that its value is not great, although it probably lessened to some extent the period of convalescence of the more slightly wounded before their return to their units. The more seriously wounded rarely became fit to rejoin their units, although many of them might probably have done so if it had not been for the fact that improvement meant return to active service, and no matter how keen a man is, this factor must function. For these latter cases orthopaedic treatment merely meant delay in evacuation to Australia, although I can assure you this delay was controlled as far as possible. Despite the above view, I consider that orthopaedic treatment is essential, and that it must be well organised and thoroughly carried out, and no General will ever be able to hold his position if he does not realise this.

²⁵ In a letter dated 5 February 1923.

First it is necessary for the morale of the troops. Soldiers cannot be treated like fighting machines, and I have seen an extremely ugly spirit among them when they thought they were not getting the same care and after treatment as the British soldiers received and—here is the point—which *they considered essential to recovery*. This spirit was recognised at its birth and the orthopaedic treatment of Command Depots was thoroughly organised.

Then *second*, the Government and people of Australia believed in this form of treatment and demanded it for their soldiers. Some of the earlier cases went back to Australia before the departments referred to were organised, and these men made bitter complaints about their treatment.

Then medical officers of the A.M.C. believe in the efficacy of massage, electro-therapy, remedial gymnastic treatment, etc.—at least 95% of them do—and clear thinking administrative officers, who consider only the military point of view, won't do much good unless they accept to a considerable extent the views of their staffs and medical officers.

Finally the serious cases must be treated thoroughly until their return to Australia, hence the necessity not only of orthopaedic treatment in Command Depots, but also of orthopaedic treatment on invalid transports returning to Australia. . . . The medical aims of the forms of treatment under consideration are many, and include the prevention of muscle atrophy by electro-therapy after nerve injury or nerve suture, and the prevention of contracture by massage, passive movement and remedial exercises.

(The usage *orthopaedic* for *physio-therapeutic* was very common at this time.)

It will be observed that Colonel McWhae moves insensibly from the military to the national outlook; and to this we now must turn. Here the nature of the cases, and the purpose in view for the patients, differ fundamentally from those set out above by McWhae. The patients for the greater part came within the field of the orthopaedic surgeon as well as of the experts in physical therapy and physical training. The objective was a vastly wider and less definite one, embracing the whole gamut of social adjustments. The experience and judgments that now have to be considered are those of the staff—in particular the surgical staff—in Australia responsible for the final stages of repair in the men arriving from overseas under the six months' policy in every stage of repair and disrepair.

The fact, acknowledged most readily by those who were themselves the least to blame for the default,²⁶ that the medical

²⁶ See for example "Physio-therapy in the Treatment of injuries in General and Orthopaedic Practice" by E. B. M. Vance, Royal Prince Alfred Hospital, Sydney, in the *British Medical Journal*, 11 Jan. 1936.

profession entered upon the Great War imperfectly equipped to support its responsibility in this field of therapeutics, has been accepted by the bulk of the profession with an equanimity that the critical author of "*Aequanimitas*"²⁷ would surely not have approved; for it is impossible to escape the conviction that the default was in a great part due to defect of heart, not of head. Throughout the ages the medical profession has been peculiarly liable to that besetting sin of all "closed" professions, mental "one-eyedness". And among the unfortunate results of this defect of intellectual vision is this, that its subject is liable to be "rattled" by attack on his blind side, and to fall into ill-adjusted action. Faced in the Great War with the fact that it was imperfectly equipped in the rationale of physical therapy, the medical profession hurried to hide the intellectual hiatus behind a shroud of mystery²⁸ and a jumble of mechanical apparatus. It may be accepted that neglect by the "orthodox" medical profession to exploit the therapeutic potentialities of this means of "suggestion" has in the past much advantaged the unlicensed practitioner. But professional probity would suggest that, when used to ameliorate the effects of some physical damage, physio-therapy must have a sound backing of physiology as well as an element of psychology. Each component, surely, in this combined offensive against physiological disability and moral defeatism must be based on exact knowledge, arrived at by arduous, intense, exact, and, above all things, honest observation and "research". The early physio-therapy of the war was, speaking broadly, not so based; and this ignorance was exploited not entirely ingenuously to cover a multitude of sins.²⁹

²⁷ Sir William Osler.

²⁸ For example, in the demand for complicated apparatus for simple exercises, and, more subtly, by exploiting the magnificence of the "unknown" in the indiscriminate and empirical use of "electro-therapy", "massage", light and other "rays" as substitutes for exact investigation and a clearly recognised purpose.

²⁹ This has been stated by one of General Howse's staff as follows:—"You know what a lot of hooey there is about this stuff. Howse was sceptical as to the value of elaborate and expensive mechanical contrivances and electric batteries in curing deformities, etc., and believed, as I believe, that perseverance in simple measures is often more effective, because patients and doctors come to expect the machines and batteries to do the work while they sit back and observe the machinery at work. Nevertheless, from the time I joined H.Q. (about July, 1917) every invalid ship was supplied with 'plinths' and other stuff, and magnificent batteries by Scholls, which we could never get back."

The war itself did little or nothing to change this professional attitude. The lack of scientific precision did not trouble the clinicians; the anatomists and physiologists had more pressing problems to occupy them. But this lack had been discerned: in 1916 Professor Langley, at Cambridge, published "Observations on Denervated Muscle" in the *Journal of Physiology*. And in the University of Sydney, N.S.W., two young men, J. I. Hunter and N. D. Royle, had "seen visions and dreamed dreams" which were inspired by a tradition of teaching and research "only excelled" (Garrison affirms) by that of Ludwig himself. The researches of Hunter and Royle on muscular tone and regeneration after nerve section carried on directly from those of Langley, just as these did from A. V. Waller (1856), Helmholtz, Du Bois Raymond, and the clinicians such as Duchenne, Hughlings Jackson, Gowers, Charcot, and Erb. This chain of research (had it been followed up), would have provided the experimental basis for "electro-therapy"; and in the following the bull is taken squarely by the horns:

Denervated muscles (says Dr. Royle) have no tone, and tone cannot be induced in them by making them contract. Denervated muscles are in a state of constant contraction, and the wasting is really due to fibrillation (Langley). Of what use then, is contraction by the galvanic current? If it does anything it increases the rate of wasting. The faradic current should be mentioned only to be condemned, since it has no effect on denervated muscles; and when the muscles have recovered, active movement is the most appropriate treatment. The galvanic current has no effect on the rate of recovery of nerve, and active movements return . . . long before faradic stimulation is possible. To apply electrical treatment in any stage is a waste of time.³⁰

We hark back indeed to Duchenne "one of the most remarkable figures which has ever appeared on the medical stage", who as Professor Arthur Keith records³¹ "was sceptical whether electrical means contributed in any way to the return of voluntary power to muscles".

It involves no derogation to the importance of the work of Hunter³² and Royle that it has been outmoded; nor (as con-

³⁰ *Medical Journal of Australia*, 22 Sept. 1934, p. 385, by N. D. Royle. See also his articles 6 Oct. 1923 and 19 March 1927.

³¹ *Menders of the Maimed*, p. 104.

³² Hunter died in 1924, while on a lecture tour in America.

cerns this present inquiry) that the views quoted above are strongly in dispute.³³ The profession has recognised a duty towards its technical coadjutors, let alone its patients and itself. We may, indeed, with confidence expect a scientific advance in this branch of physical therapy analogous to that which to-day informs pharmacology and bio-therapy.

For massage and "movements" Professor Keith is in the authentic tradition of Hippocrates, Hunter and Ling when he quotes with approval Colonel H. E. Deane:³⁴

"Any method of treatment which lacks the essential factor of stimulating and encouraging the man's own power of will-to-do, which has been inevitably weakened by the stress through
Massage and Movements which he has passed, stands self-condemned. This factor of volition is vital. The man must do this himself, and exercise his own volition and put his own motor centres in action. A fraction of movement obtained in this way is infinitely more valuable than a greater amount gained by passive methods."

And when he speaks for himself:

"There is no miracle in the art of healing except that which is wrought by the power of repair inherent in living flesh; all the rest is hard work—hard thinking on the part of the medical man and constant and intelligent effort and co-operation on the part of the patient."³⁵

The "more excellent way" of scientifically directed volun-

³³ In particular through the work of S. S. Towers and others in America; and in Australia of J. C. Eccles at the Kanematsu Institute of Pathology in the University of Sydney, N.S.W., and G. Reid of the University of Melbourne, on the atrophy of disuse and of denervation (*Medical Journal of Australia*, 10 May and 16 Aug. 1941). But the present-day view, as summed up with authority (*Journal of the American Medical Association*, article "Authorised by the Council of Physical Therapy", 9 Sept. 1939) is that "the degree of regeneration of the peripheral nerve is not (actually) influenced by the use of physical therapy measures"; and that though "in the restoration of muscle, physical therapy is of value" . . . "further studies are needed to correlate the restoration of function with the return of muscle bulk in order to establish more definitely the effects of physical therapy measures".

³⁴ *Gymnastic Treatment for Joint and Muscle Treatment*, quoted by Prof. Keith, *ibid.*, p. 220.

³⁵ It may be proposed, with due deference to the specialty, that the chief functions of massage *per se* are *rest* and *relaxation*. The following seems to express the idea. (*St. Mary's Hospital Gazette*, London, June 1935, p. 84, article by Mrs. Guthrie-Smith, Director of Massage Department.)

"Relaxation is a physical and mental state which should be practised and experienced to be understood. The method we practise aims at obtaining a 'general relaxation of the whole body'—through the brain and the whole central nervous system. . . . It is quite usual for the patients to fall into a deep restful sleep even in our busy noisy department, once they are accustomed to our technique, and when we have succeeded in getting them into a 'plastic state of mind'. In spastic nervous diseases the muscles mentioned are nearly always tense and rigid, and it is remarkable if the muscles yield to this treatment, how wonderfully rested the patients feel. They sleep better, eat better, and are less irritable, they gain something definite and the results appear to be cumulative, if that expression may be used. Although they may appear to walk as badly, we find them less helpless, and they have gained 'power through repose' . . ."

tary effort has never better been stated than by Lord Horder—quoted by Lieut.-Colonel James McConnel in his admirable *Shorter Convalescence*:

No amount of massage, and no amount of electrical stimulation of whatever kind, has the same physiological value as the natural movement carried out by the patient under supervision and careful guidance. This is a principle that should never be lost sight of.

This much at least is certain: whatever be the future of the Australian Service of Massage, its members can be assured that their art and technique will rest now on a scientific basis of clinical and experimental research. And for this they, and medical science in general, owe tribute to the pioneers of the war of 1914-18.

SECTION IV—THE AFTERMATH OF WAR

CHAPTER XIII

THE AUSTRALIAN INVALID IN ENGLAND

THE last chapter of the previous volume described the administrative responsibilities of General Howse and the executive duties of the Australian Medical Service in England, in two broad fields of action, the bounds of which were determined by the verdict that had to be given by the senior medical board on recovered men: whether they were "likely", or "unlikely" to be "fit for military duty within six months". The procedure devised for disengaging these two primary classes of recovered men, and the methods and machinery built up in England for dealing with those who comprised the first group, have been described in the previous volume. The present chapter examines the medical problems arising in England during 1916-18 from soldiers comprising the second group.

The first volume¹ told of the evolution of invalid transport to Australia during 1915, first from Egypt and somewhat later from England, whither Australian casualties had overflowed from the Levant. The principle laid down by the D.G.M.S. in Melbourne, that Australia and not England should be the medical base for the A.I.F. fighting in Europe, had been accepted by the Australian Military Board, and the Australian medical policy and provision in England—quite different from the Canadian—had been built on it. Australia maintained in the western theatre of war only the following medical units:

*France and Belgium*²

General Hospitals	Cas. Clearing Stations	Field Ambs.	Conval. Depot	Sanitary Sections
3	3	15	1	5

¹ See Vol. I, Chap. xxvi.

² In addition to the above, the D.M.S., A.I.F. found the staff for a section of a British General Hospital which took venereal cases, and the nursing staff for several hospitals in France and England. The Australian Voluntary Hospital at Wimereux was staffed entirely by Australian medical men until its absorption into the British Service as No. 3a Stationary Hospital. Admirable pioneer work was done by this unit. See Vol. I, pp. 491-2, Vol. II, pp. 314-15.

*England*³

General Hospitals	Auxiliary Hospitals	Austn. Dermat Hospital	Conv Homes	Camp Clearing Hospitals	Bacteriological Laboratory (London Command)
I	3	I	5	3	I

The welfare of Australians in British hospitals. Admittedly this system had, as well as the advantages that caused its adoption and which are referred to elsewhere, certain disadvantages. It is not questioned but that the British primary hospitals varied considerably in the standard of professional skill and of ministration, and it must unreservedly be accepted that a grievously sick or wounded Australian soldier desired, above all things, a touch of home. Whether the first would have been met by providing Australian-staffed hospitals for all Australian casualties is a question which can hardly be answered categorically. Whether the possible advantages would have outweighed the disadvantages is still more problematical.⁴ The steps taken by General Howse to counteract, so far as possible, the two defects here mentioned have been set out as follows:

The problem of effective treatment was met by the agreement with the War Office whereby Australian casualties were, so far as possible, concentrated in selected hospitals in the south of England, and by an exact system of inspection. The duty of providing special comforts was undertaken by the Australian Red Cross Society and was the most important of the efforts made to secure for the sick or wounded Australian soldier the special comforts and amenities which the Australian people rightly believed it their duty to provide.

Technique of co-operation. Effective co-ordination between Australian Administrative Headquarters and the British War Office was insured by means of successive issues of *Army Council Instructions*, which laid down with great clarity and exactness the procedure to be adopted and returns to be rendered by Commanding Officers of British Hospitals in respect to the soldiers of each of the dominions. These included the despatch *daily* to Australian Headquarters of a nominal roll of admissions during the previous 24 hours, a return of transfers from one hospital to another, and of all discharges and deaths; and a *weekly* return of the A.I.F. patients in hospital as at 8 a.m. on each Friday.

³ No. 3 Auxiliary Hospital was formed by No. 1 Australian Stationary, No. 3 A.G.H. was in England for five months only. One British convalescent hospital was used entirely for Australians—the Bishop's Knoll Auxiliary (conducted by Mr. and Mrs. R. E. Bush) of No. 2 Southern General Hospital. The Australian convalescent hospitals were, for the most part, housed in premises lent by private persons—Mr. C. A. M. Billyard Leake, Mesdames Buckley, Acland, and Hall.

⁴ The parallel problems in the Gallipoli and Palestine Campaigns and in England are dealt with in *Vol. I*, pp. 395, 495, 501, 652, 754.

But it was not until the Australian infantry was transferred to the Western Front that the full implications of the "six months' policy" were squarely faced in the A.I.F.; and not till near the end of the war were they fully apprehended and provided for in Australia.

The administrative experiments of Surgeon-General Howse in this sphere of his responsibilities, and the activities of his executive staffs, were motivated by a primitive impulse which has been stated by one of his officers⁵ as follows:

Any large organisation in England, like the Canadians had,⁶ would have held up the policy of shipping [unfit men] to Australia as quickly as possible. . . . This [sending back of unfit men] was a clear-cut policy . . . nothing was allowed to interfere, and it determined to a great extent all the medical arrangements in England.

The history of the Australian invalid in England was, indeed, that of a rational and a successful endeavour, *first*, to fit him to the precise, not to say procrustean, requirements of the policy; and *second*, to adapt the medical facilities for invalid repatriation, in particular the accommodation in the Australian hospital ships and the "invalid transports", to the pathological states and functional derangements constituting the condition of "invalidism".

As attrition warfare discarded its "spoil", and convalescents of "B2" and "C" classes flooded the Australian Auxiliaries and No. 2 Command Depot, there evolved, in response to the stimulus, a unique and exactly integrated system of administrative and executive activities directed to the prompt repatriation of the "invalid". The main parts of the system have been summarised as follows:

(1) The procedure for identification and disengagement of the "invalid"—the system of medical boards and clinical consultants. (2) The medically controlled system of hospitals for interim treatment—British Special Hospitals and Australian Auxiliaries. (3) Complementary to the last, the military system of convalescent depots—under the command of the G.O.C. A.I.F. Depots in U.K.; in particular that comprised in the several "camps" of No. 2 Command Depot at Weymouth. (4) The administrative departments and executive officers of A.I.F. headquarters

⁵ Lieut.-Col. L. W. Jeffries, A.D.M.S.3, in a memorandum written in 1918 at the request of the Australian medical collator

⁶ An account of the Canadian organisation in England will be found in *Vol II*, pp. 427-8, 825-6n.

in London—in particular the A.D.M.S.—and of Australia House, whose job it was to obtain sea transport to Australia through the British Admiralty, to fit up, equip, and scientifically staff the vessels, to make up the boat-rolls; and to assemble and embark the invalids.

During 1916 highly controversial questions arose in connection with invaliding—in particular, regarding the means and method of repatriation, the extent to which reparative treatment should be carried out in England, and how far the Australian Auxiliary Hospitals there should be made use of or a more ambitious scheme of treatment undertaken.

All these questionings were ended by the German U-boats. From the beginning of 1917 two factors were dominant in the Australian invaliding problem: *first*, that the food supply of Great Britain was dependent on the ability of the Admiralty to control the excess of sinkings over new tonnage—and at one time the odds seemed on the U-boat; and, *second*, the related fact that the securing of suitable transport for the repatriation of Australians was so precarious that the question of interim treatment, and all else, had to take second place to the duty of immediately filling the ships with returning men whenever such ships became available. During 1917 and 1918, as the question of food supply loomed more and more menacing, the efforts of General Howse were directed—with increasing singularity of purpose, and the prodigious “drive” that characterised his administration—to adapting the Australian medical arrangements in England to the naval and national situation, the gravity of which was very imperfectly appreciated by critics outside the inner circle of affairs.

It thus came about that the policy of prompt return of all unfit men to Australia became a matter of major importance in the problem of Imperial co-operation. But at the same time the requirements of special provision for the stream of badly damaged men pressed for solution; and as attrition swelled that stream, and the food problem became more and more acute and the outflow more obstructed, these requirements came to constitute a formidable problem of Howse’s medical administration. And, at the other end of the world the responsibility for providing reparative and re-enabling treatment, light-heartedly assumed by the Australian authorities in 1915, could not be eluded when its formidable character became evident.

There resulted a vigorous, even embittered, onslaught on Surgeon-General Howse's interpretation of the six months' policy. The pressure came from both ends—from Australia, where the medical authorities found that on some counts they had "bitten off more than they could chew"; and from the medical officers in the Australian Auxiliary Hospitals, whose clinical instincts were outraged by the tyranny of this military expediency. Other and vigorous criticism of policy came from outside the medical service.

The resultant of these two forces—of the military and political urge for repatriation, and of the professional impulse for delay in the interests of treatment—constitutes the history of invaliding in the Australian Imperial Force on the Western Front.

Invaliding was actually the last stage of evacuation, of which the earlier stages were followed in *Section II* of the previous volume. Though the *tempo* of action slows down, the nature of that action is essentially the same—a co-ordinated procedure of *movement* and *treatment*, with the interests sometimes of the one, sometimes of the other, dominant. A prime feature also still was the division of casualties into "stretcher cases" and "walkers"—or, as now, "sitters". In effect, this determined two broad lines of procedure and disposal: (1) Whether, pending embarkation, the invalid should be held and treated (*a*) in an Australian Auxiliary Hospital (or, for officers, No. 3 London General Hospital) or (*b*) at No. 2 Command Depot, Weymouth (or, in the case of officers, in the Australian officers' hostels or on furlough under the "Harrowby" scheme); and (2) whether he should travel to Australia by hospital ship, or by an "invalid transport".

The Australian soldier, arriving from France sick or wounded, had gone direct to a British General Hospital. The primary discrimination, made at the port of disembarkation, of certain types of case—psychic, cardiac, eye-injury, femurs, amputations, etc., for the purpose of their direct admission to appropriate "special" hospitals, was not usually applied to the Australian soldier, who by arrangement was kept within the three southern "commands", instead of being transferred,

after initial recovery, to the special hospitals concerned in "reparative" treatment—the Military Orthopaedic Hospital at Shepherds Bush, Queen Mary's Auxiliary Hospital, the Roehampton Hospital for limbless, the Seale Hayne Neurological⁷ Hospital, Newton Abbot, the Red Cross Military Neurological Hospital, Maghull and the Maudsley Neurological Clearing Hospital for the study and intensive treatment of psychic disorders, and so forth—the Australian soldier was sent direct to an Australian Auxiliary. Thus, with certain exceptions (to be noted later), for the Australian soldier overseas these Auxiliary Hospitals took the place of the imposing system of special clinics, hospitals, and research centres created in England during the war to meet the many novel states of disrepair and dysfunction; hospitals in which the final stage of healing was regarded as being also the beginning of a new and even wider field of clinical experiment and research into the possibilities of structural repair and re-enablement.

The outstanding fact in the problem of A.I.F. invalids in England was this—that, contrary to the normal sequence of events, which would make the base a place of unimpeded rest and recovery, in the Australians' case the need for *movement* was still the dominant factor. For the Australian soldier recovery was not even at that stage an end in itself, but in a great measure was still only a means to further onward movement.

The repatriating machinery that determined the duration of treatment and initiated the resumption and direction of movement was the system of **Discriminating the invalid: the medical boards** "*Medical Boards*", with the Consultant Physician and Surgeon, A.I.F., as the final referees.

This most difficult art of "medical boarding"—the assessment of the degree of present and future disablement—required, first, the accurate adjustment of "category" to fit the particular physio- or psycho-pathic complex under review; and, second, consistency in the findings. The "finding" purported to express the sum total of medical knowledge as applied to the

**The ideal
boarding
officer**

⁷ In the war the term "neurologist" was officially applied to specialists in psychological medicine.

condition and case under review. It involved diagnosis, both clinical and pathological, of the condition, and the amount of therapeutic possibilities; together with that *ultima thule* of the medical art, a prognosis. It called for the highest clinical acumen implemented by a wide knowledge of human nature, in particular, of the soldier, young and old.

Medical boarding in the A.I.F. was based on the principle that primary findings by local medical boards of physicians and surgeons in the Auxiliary Hospitals or in the Command Depots, should be reviewed by the permanent A.I.F. boards, "Senior" and "Junior". The permanent medical boards, attached to General Howse's staff at Administrative Headquarters were constituted as follows:

(1) A senior permanent Reviewing Board, of two members: the Australian Consulting Physician (Colonel H. C. Maudsley) and Consulting Surgeon (Colonel C. S. Ryan).

(2) The junior permanent Reviewing Board. This comprised a President (who for the greater part of the time was Colonel B. J. Newmarch) and two members. These latter were employed temporarily and were assisted by specialists—heart, eye, nose and throat, and so forth.

A.I.F. procedure in boarding naturally fell into line with that of the British Army.⁸ The personnel of the senior A.I.F. board was unchanged throughout the war. During 1915 Lieut.-Colonel Maudsley acted as Consulting Physician to the Egyptian Command, and by reason of his clinical insight and judgment his opinion was much sought after.⁹ Through the observations made by him during this period what might be called a "science" of boarding was built up, and a standard of care and conscientiousness established which greatly helped to smooth the passage of this most awkward junction throughout the terrible years of attrition. In 1918 the British D.G.M.S. (Lieut.-General Keogh) desired General Howse to nominate a Consulting

⁸ The early history of the medical boards in the A.I.F. was described in some detail in *Volume I* and their later organisation suggested in *Volume II*.

⁹ His own opinion as to the qualities required was: "It is very important that a Consulting Medical Officer should know all about the various diseases in the Army in the General Hospital, and that any disease such as Venereal Disease, Measles and Mumps should be given his most earnest attention. In taking this view I found life full of interest, and Respiratory Diseases and ordinary Diseases occurring among the troops, however treated, were scientifically of the utmost intrinsic importance to myself. I got on well with the O.C. and with the officers below me, perhaps because I was always busy and concerned myself with the work I was doing. The secret of my satisfaction in my work was that there was plenty to be done, and I was fully occupied in doing it. There was no time for disputes over unessentials which did not vitally affect the work in hand."

Physician and Surgeon for service with the B.E.F. and Howse gave Colonel Maudsley the option of the first. His reasons for declining this distinguished honour are worthy of record in the annals of the Service.¹⁰

Howse said to me (states Maudsley): "Would you wish to go—I won't advise you either way." I elected to stay at work in England. Howse agreed that the work that I could do in England in advising as to the treatment of our cases in England, and on the revisory board for medical cases, was of more service to Australia and Australians than to be one among the many consultants in France not concerned specially with Australians, and for which posts there were scores of men in England of the highest scientific and professional standing.

The surgical consultant, Colonel (later Major-General) Sir Charles Ryan was an original and colourful figure in the Australian Medical Service and profession. He had served in the Turkish Army in the Serbian War of 1876 and the Russo-Turkish War of 1877-8. As Senior Surgeon to the Melbourne Hospital he had a reputation for courage and common sense rather than for more intellectual qualities, and his service as Senior Surgical Boarding Officer was in accord with this. He acquired a reputation, probably not without some justification, for inconsistency—the separation of the sheep from the goats in accordance with the six months' policy was apt to be unduly influenced by the military situation. In this, when all is said, he was but a reflex of the war mind, and moreover, the material with which he dealt made a sceptical attitude inevitable, consisting, as it did, largely of men whose claim of "unfitness for service" (to quote from his report to the Australian Government¹¹) was based on disabilities such as appendicitis, hernia, varicocele, varicose veins, haemorrhoids, deafness, deficient sight, flat feet, and old-standing injuries.

The implements by which the medical boards achieved their purpose of co-ordinating movement with treatment were (1) the system of medical categories, (2) the "Medical Report on an Invalid"—*A.F.B.* 179, or, more commonly, the "board paper".

(1) *The "categories"*. These have been exactly described in *Volume II*¹² where an account was given of their part in the progress of

¹⁰ Extract from interview by Col. A. G. Butler with Col. Maudsley (March 1919).

¹¹ See *Vol. II*, pp. 843-4.

¹² *Chaps. xiv, xv.*

the fully recovered casualty through Nos. 1, 3 and 4 Command Depots to the "Overseas Training Brigade". The account there given applies *mutatis mutandis* to the regression of the "invalid" through No. 2 Command Depot to the embarkation roll for shipment to Australia. The chief difference lies in the fact that, whereas the categories of recovery—"A" and "B1"—were for the most part allotted by local boards in the Depots, those that led to invalidity, or to "home service"—"B2" and "C"—were imposed or confirmed by the two permanent boards.

(2) *The "Board Paper". Army Form B. 179.* On this document, and *A.F.B. 403* ("Casualty form—active service") supplemented by the "Medical History Sheet" (*A.F.B. 178*), was based the vast structure of invaliding, after-care, and pensioning. The *B.179* consisted of: (1) a history of the disability based on the man's statement, and the "medical history sheet"—when available;¹³ (2) a note of the present condition of the patient as found by the boarding officers; (3) the opinion of the Medical Board as to the "cause" of the disability, whether acquired on service, its probable duration, its effect on his earning capacity "in the general labour market"; and (4) the recommendation of the Board as to the soldier's disposal. The disposal of the Board Paper and the use made of it are examined elsewhere.

The actual points at which the medical boards intervened will appear as the narrative follows the Australian invalid from the British hospital through the various treatment centres to a hospital ship or transport to Australia.

"Battle casualties" and "sick". It will be recalled that in examining the medical problems of the British Expeditionary Base in France it was concluded that, by the

Clinical factors
—types of
invalid

time the base had been reached, various types of "injury" were becoming frankly "disease".

Instances were given in the case of gassing, trench foot, the psychic effects of shell-concussion, and even so gross an injury as thoracic wound. Now, at the final base in England, this drift into "disease" will be found increasingly definite; and so on, until in the post-war years there will be noted a few gross and obvious deformities and cicatrices, and an immense mass of "disease", physical and psychic, chiefly in the nature of fibrous substitutions and mental degradations.

The stage with which the present chapter deals is mainly

¹³ A serious defect in the procedure of "boarding" which militated greatly against the value of the record, was the frequent failure to ensure that the "Medical History Sheet" (*A.F.B. 178*) was available to the boarding officer. The "Medical Case Sheet" was never available, being dealt with by an independent Department—the Medical Research Committee. Thus the only previous history available to the Board was the personal statement of examinee, which was always defective and often disingenuous.

the penultimate stage of healing—in effect the condition of “imperfection” postulated by H. O. Thomas, of injured joints. In this stage structures—bone and joints, muscle, connective tissue, skin, nerve—and functions, both organic and psychic—cardiac sufficiency, muscular co-ordination, psychic ex- and inhibitions—were “plastic” and amenable to “treatment”, preventive or reparative. In the Australian force this stage coincided, more or less exactly with *fitness for repatriation*, and this chapter concerns itself first with the penultimate problems of *wounding*.

In a comparatively large proportion of men structural repair and the attainment of tissue normality were far from being synonymous with a structural *restitutio ad integrum*, or adequate to form the basis for the recovery of functional efficiency. These men provided technical problems that made them a formidable element in the national consequences of war so far as the medical profession is concerned. Damage to nerves and tendons, ununited or ill-set fractures, muscular deficiency, bodily deformity, together with loss of limb or other structure, nose, jaw, and so forth—all these provided problems—technical, administrative, and national—that will in the end have cost almost as much in money and trouble as the war itself.

The technical procedures and devices that have been invented by the wit of man to remedy or palliate these disabilities, are commonly distinguished as (1) *orthopaedic surgery*—surgery of function—in particular of movement and posture; (2) *plastic surgery*—the surgery of form; (3) *prosthetics*—the surgery of artificial replacements, chiefly of limbs, jaws and eyes.

The evolution of reparative surgery in Britain followed closely these three lines.

Reparative surgery in Britain 1. *Prosthesis in Britain.* The problem of artificial replacements¹⁴ was an old one and, on the experience of the South African War, early in 1915 a special Auxiliary Hospital was established at Roehampton to grapple with it. Here men were

¹⁴ The terms “prosthesis”, (the addition of an artificial part to supply a defect) and “prosthetic”, are often applied both to plastic surgery and to artificial replacements (see e.g. *British Official Medical History, Surgery, Vol II*). It would seem advantageous to reserve them for the art of artificial replacement—as of limbs, nose, eyes, dentures, etc.

"cared for and kept occupied" while waiting for their artificial limbs to be fitted. The fundamental advance—a gradual one be it said—to wit, the escape from the tyranny of the limb-maker and acceptance by the surgeon of complete responsibility as a legitimate branch of the surgical art—has already been recorded,¹⁵ and need not further be dealt with; the history of Roehampton however closely evolved with that of the A.I.F. and will come up later.

Artificial eyes. Australian soldiers shared with British troops the advantage of the splendid work done at St. Dunstan's Hostel for war blinded soldiers.

Artificial noses. Replacement of the nose ultimately merged with the plastic surgery of face and jaw. But a mention is due to the admirable work done at 3rd London General in 1915 by eminent artists, Derwent Wood, Tom Roberts and others, in the construction of artificial noses of various materials, appropriately coloured.

Jaws. Like all other forms of prosthesis, the prosthetic dentistry of war wounds evolved slowly. As with all other types of surgical repair the key to advance was found to be in the exploitation of the plasticity and vitality of tissues in which the blood supply was preserved and sepsis excluded. Some account of this work has been given in Chapter VI.

2. *British orthopaedic surgery.* The nature of the technical problems of surgical repair has been referred to in *Chapter VI*. It might have been supposed that some foreboding of the problems that must inevitably occur as the aftermath to wounding would have been felt from the outset of the war, and have been in some way prepared for. But in Britain as in Australia¹⁶ the after-treatment of crippled men was, at first, nobody's business.

The *British Official Medical History* says:¹⁷

The formation in the early months of 1916 of military orthopaedic hospitals was only one of the special needs which the first eighteen months of the war had made apparent, and the formation of special hospitals or sections of hospitals for face injuries, head injuries, cardiac disorders and lung conditions following the use of poison gas, all began about the same time.

¹⁵ See *Chap. vi*.

¹⁶ See *Chap. xv and Vol. I, p. 540*

¹⁷ *Surgery of the War, Vol. II, p. 382.*

The circumstances which brought this about—strongly reminiscent of events in Australia—are described by Sir Robert Jones.¹⁸

The pressure on accommodation was such that from time to time various orders were issued for the discharge from the Army of men who would not be fit for active service within a specified number of months. The result of this was that men were discharged from the army and from hospital as soon as their wounds were healed and their general condition allowed them to leave, but they were not cured of their physical disabilities. Consequently, the civilian population was steadily becoming more and more burdened with wounded men not fit to earn their living, and not likely to become fit until they had some further surgical treatment. . . . They included cases of mal-united fractures, which required operative treatment; ununited fractures, many of which required bone grafting; old cases of nerve injuries requiring suture, and innumerable cases of stiff fingers, ankylosed joints, and contractures due to scars following septic wounds.

This was a state of affairs which presented grave dangers from the economic standpoint. . . . There was no Pensions Ministry at this time to supplement treatment.

It was from Robert Jones himself, a Liverpool surgeon, that there came the initiative that created a vast scheme of military orthopaedics in Britain; and its inspiration derived from the Liverpool School of Orthopaedics. In Britain, as in Australia, before the war

the practice of orthopaedic surgery as a special branch had not been much encouraged by English hospitals and schools of medicine.¹⁹

Indeed during the previous half century British orthopaedic surgery had slumped badly. The traditions of the Hunters and Sir Charles Bell had passed to America, and the British orthopaedic prophet had no honour in London; Liverpool was a Mecca for all the world except England. The war changed all that. Under Sir Robert Jones who in March 1916 was appointed "Inspector of Military Orthopaedics", an organisation was built up which, starting in Liverpool (Alder Hay Hospital) with 250 beds, by January of 1918 had increased to 16 centres containing "close upon 15,000 of our wounded". And 75 per cent. of the men treated had been returned to the Army.²⁰

¹⁸ "An Address on the Orthopaedic Outlook in Military Surgery" by Col. Sir Robert Jones, C.B., Ch.M.—*B.M.J.* 12 Jan. 1918, pp. 41-42. See also "Military Orthopaedic Hospitals" by Dr. (later Sir) W. Colin Mackenzie (*British Medicine in the War, 1914-17*—London: B.M.A., p. 78).

¹⁹ *British Official Medical History, Surgery, Vol. II, p. 383.*

²⁰ Sir Robert Jones. *loc. cit.*

From the war and post-war literature of reparative surgery one principle of outstanding importance emerges, namely, that the process of recovery and repair after wounding must be envisaged as a whole. Orthopaedic surgery, Sir Robert Jones has said, begins at the front line; and there is ample evidence in the Australian records that Australian surgeons would support the contention. And of the specific factors in the therapeutic problem of wound repair one stands out pre-eminent, namely sepsis, in particular with streptococcal infections. "Sepsis" was the bug-bear of reparative surgery; and the risk of early operation in the healed "septic" wound was the uncertain element in the implementing of Australia's "six months' policy".²¹

The Australian soldier was almost untouched by the vast organisation in England—the six months' policy sent him home. His destiny lay with the medical profession in Australia: all that could be done by the medical service of the A.I.F. was to pave the way for vigorous, prompt and effective action in Australia.

3. *British plastic surgery, Sidcup.* "Plastic" and "orthopaedic" surgery are alike in this, that in both procedures living tissue is moulded to re-create a destroyed or damaged part. But between them is this great gulf fixed; the prime purpose of the first is the restoration of form and structure, of the second the recovery of "function". Against this, it is true, must be said, that even when the purpose is wholly the anatomical restoration of form the structural repair of some hideous facial deformity cannot altogether be divorced from a "functional" purpose; though here the motivation is psychic—the restoration of the wish to live—rather than physiological—the restoration of movement.

It was for this human and spiritual purpose that the "Imperial" War Hospital, Sidcup, was established by the British Red Cross Society.²² In this unique unit British, Dominion and American "teams" worked in their own "pavilions". The work, which has been illustrated elsewhere in this volume, and which was one of the finest products of humane endeavour in the war, has been described as follows:

²¹ See *Chap. vi* and *Vol I, Chap. xxiii*.

²² The part played by the D.M.S., A.I.F. and Australian Red Cross Society in the development of this Imperial unit was described in *Volume II, Chap. xxiv*.

Queen's Hospital, Sidcup, was established for its original purpose in 1917, but its history dates from 1915, when organised care and treatment of facial and jaw injuries had been started in France, and a beginning had been made at Cambridge Military Hospital, under the direction of Major H. D. Gillies, who, while serving with the British Red Cross, had seen the results obtained by Morestin and Valadier and others. Major Gillies was allotted 200 beds at Cambridge as a beginning, but accommodation there soon proved inadequate, and Frognaal House, Sidcup, once the residence of Earl Sydney, was secured. In a large number of cases two, three and even four years were required to build up and restore the features of men, who otherwise would have been horribly and permanently disfigured. Mainly through the experience gained in the treatment of war cases, surgery to-day can effect cures in a large proportion of hopeless instances of facial mutilation. In 1924 treatment of facial cases, which had been reduced to 70, was removed to Roehampton. From August, 1917, to May 31, 1929, the number of patients received was 18,135, including 73 officers and 1,260 other ranks from the Canadian, Australian and New Zealand armies. In addition to Queen's Hospital, 647 officers were treated at Sir John Ellerman's Hospital at Regents Park.²³

The analogous pathological and psychic deformities (if they may be so called) the result of traumata such as cold, hardship, infection, mental strain—less gross than those of wounds are far less easily categorised, as **Reparative medicine: the lapse to chronicity** was also somatic disorder brought about wholly or in part by "inborn tendencies". Both were commonly discriminated as diseases; and in this matter of war diseases it is useful to retain the concept of an *injury* with its corresponding *reaction*; the nature of such reaction depending upon the constitution, inherited or acquired, and the immediate state of nutrition. This line of thought brings the treatment of disease into parallel with that of wounds, as (a) curative and (b) reparative.

With the immediate "cure" of disease in the war, this history has little concern—medical treatment seldom differed in any way from that of peace.

The salient feature in the history of *reparative medicine* (as distinguished from *reparative surgery*) in Great Britain and Australia was the slow recognition of the fact that the Army was concerned with it.

It was only gradually realised that in diseases not brought about by some progressive and irreversible pathological degradation, or some ineradicable infection, such diseases in which

²³ From *Reveille*, Feb. 1930, p. 13.

the natural processes of repair might bring about physiological restitution, the problem of treatment was, to the extent at least of 3 to 1, a problem of *mind* and of *morale*. Not unconnected with this discovery came the rise of *psychological* medicine to a place in the hierarchy of the medical sciences even beyond its undoubted importance—a development which brought it indeed into unnatural conflict with physiology and even with common sense.

As with the new orthopaedics, the new reparative medicine left the Australian soldier almost unaided. It was carried out in the various hospitals directed to the treatment of special diseases, *e.g.* in the Maudsley, Seale Hayne, and Maghull Hospitals for varied manifestations and forms of mental disorders; at the Colchester Hospital for disorders of the heart; at hospitals for “rheumatism” and many other disorders. But here again, the “six months’ policy” carried the war-shocked Australian soldier rapidly through the British hospitals and the Australian Auxiliaries, to his homeland to which, as with “orthopaedic” repair his further therapeutic adventures belong.

A broad picture of the diseases of the war as seen at this stage in the A.I.F. in the Western theatre of war is found in a report²⁴ of the Consulting Physician, A.I.F., Colonel Maudsley, and a table showing, with their respective totals, the causes for which Australian soldiers were invalided from the Western theatre of war. The interest of the experience disclosed in this report centres on the contrasts and similarities between the observations made by Colonel Maudsley on the Gallipoli experience (1915) and that of the Western Front (1916-18)—in particular, the dramatic rise of the *psychic factor* in causing or aggravating disablement.

In May 1916 at the request of General Howse, Colonel Maudsley had reported on his experiences as member of the Australian reviewing board in Egypt in 1915. This earlier report was found of great use by the Director-General in Australia.²⁵ In 1918 Howse obtained from Maudsley a second report based on his observations of the invalid problems of the Western

²⁴ See Appendix No. 4.

²⁵ See Vol. II, p. 901. It was followed by a less exact survey of the surgical problems of invaliding by the surgical consultant, Sir Charles Ryan.

Front. Both of these reports distinguished those disabilities which antedated active service at the front from those that were "due to" active service.²⁶ The following conditions were discriminated for particular comment, and their disposal and treatment are touched on elsewhere in these pages—"War neuroses", "D.A.H. and effort syndrome", "trench fever", rheumatism, myalgia, gassing.

On the other hand the archives of the Australian Imperial Force are seriously lacking in systematic record of the surgical problems of recovery, and those available from within Australia of the final stages of war-wounds are even less helpful. However, as there were only two types of injury—loss of a limb, and injury to the face and jaws—for which an Australian soldier was held for treatment in England for longer than would suffice to procure immediate healing, the lack of record does not seriously impede the discussion in this chapter.

Observations complementary to those of the Consulting Physician (recorded above) are found in reports by the clinicians in the Auxiliary Hospitals.²⁷ In February of 1917—the date of the beginning of the unrestricted U-boat campaign—a series of 2,000 consecutive boardings at No. 1 Auxiliary was analysed for the Director of Medical Services by Lieut.-Colonel E. Buller Allan, and classified according to the *duration of their disabilities* and their *cause*.²⁸ The result, with Colonel Buller Allan's comments, are given *in extenso*, as providing in anticipation, together with Colonel Maudsley's figures and comments, a useful obverse to the experiences to be studied later in dealing with the problems of Pensioning in Australia.

²⁶ The experience of the A.I.F. in the matter of unfit recruits has been dealt with in *Vol. II, Chap. xxvi*. In nothing are the medical records of the A.I.F. more definite and unanimous than in this; that the question of "attribution" and "aggravation" should be the concern of the attesting officer only less directly than of the boarding officer. It may indeed be said, on the evidence accumulated by the A.I.F. Boards in England during 1916-18, that the matter is one which should be exactly examined and defined in the peace-time preparations for war, and embodied in the standing orders for the examination of recruits.

²⁷ The account of *boarding* is taken chiefly from an admirable note written for the history by Maj. G. C. Willcocks. Few medical duties deserve more and receive less attention in the preparations for war.

²⁸ Lieut.-Col. Buller Allan's "remarks" have been slightly abbreviated. The table has been rearranged, and the various conditions as diagnosed shown as a percentage on the total number boarded (for disease). The term "old" means existing prior to enlistment, "new", acquired subsequently. See *Chaps. xvi, xvii*.

Table of the last 2,000 Boarded cases.

Direct injury by G.S.W's or Traumatism 1,201

All other cases (classified below) 799

	"New"	"Old"	Total	Per-centage		"New"	"Old"	Total	Per-centage
<i>Nervous.</i>					<i>Renal and Urogenital.</i>				
Shell-shock (incl. Spinal Con-					Stone, Pyelitis and Cystitis ..			6	0.75
cussion—Functional)			75	9.38	Epididymitis			1	0.13
Neurasthenia (not due to Shell-					Nephritis	24	8	32	4.00
shock)	10	11	21	2.63	<i>Diseases of Blood-forming or-</i>				
Dementia and Recurrent Insan-					<i>gans.</i>			3	0.38
ity	10	4	14	1.75	<i>Infections.</i>				
Epilepsy	8	16	24	3.00	Dysentery and its sequelae ..			34	4.25
Hemiplegia	1		1	0.13	Bilharzia	1	1	2	0.25
Diseases of the Cord and Per-					Cerebro-spinal Meningitis ..			5	0.63
ipheral Nerves	4	2	6	0.75	Malaria			5	0.63
Diabetes Insipidus and Mellitus			6	0.75	Infectious sequelae:—Osteo-				
<i>Special Senses.</i>					myelitis—Typhoid and Tuber-				
Eye Affections		18	18	2.25	culous			4	0.50
Nose and Accessory Sinuses ..	2	4	6	0.75	Oedema of Leg			4	0.50
Ear	16	33	49	6.13	<i>Alcoholism.</i>			2	0.25

<i>Pulmonary.</i>					<i>Veneral Diseases (incl. Tabes)</i>					<i>5*</i>	
Tubercle—definite	44	35	79	9.88	Rheumatism. Sciatica, Lum- bago and Rheumatic Fever	32	41	73	0.63		
Fibrosis of Lung (Prob. Tubercu- losis, no T.B. in sputum)	10	1	11	1.38	Gout		2	2	0.25		
Unresolved Pneumonia			11	1.38	Senility—age 45-59						
Pleurisy and Empyema			16	2.00	Rheumatic	7					
Asthma	8	33	41	5.13	Bronchitis	4					
Bronchitis	3	5	8	1.00	Cardiac	7		33	4.13		
<i>Cardiac.</i>					General Debility	15					
V.D.H.	23	38	61	7.63	Malignant Tumours.			2	0.25		
D.A.H.—a sequela of Pyor- rhoea, Pneumonia	32	3	35	4.38	Knee Injuries and Dislocated Cartilages.	12	9	21	2.63		
Hypertthyroidism with D.A.H.	16	4	20	2.50	Surgical deformities.						
<i>Digestive.</i>					Hypospadias			1	0.13		
Gastric Ulcer and Gastritis ..	13	8	21	2.63	Varicose Veins	2	4	6	0.75		
Appendicitis	7	3	10	1.25	Hernia	3	6	9	1.13		
<i>Hepatic.</i>					Of Hands		2	2	0.25		
Hypertrophic Cirrhosis			3	0.38	Of Legs (old fractures)		3	3	0.38		
Hepatic Abscess			2	0.25	Of Feet		6	6	0.75		

Noting the fact that the table showed that in many of the patients the condition existed before enlistment, Lieut.-Colonel Buller Allan made certain comments which, though relevant and important, cannot be accepted as true of every case. Traversing the "old" cases he says:

The invalid, knowing that he had an infirmity, wilfully posed as a healthy individual, in order to enlist; in fact in some of the cases (*e.g.* one epileptic) the patient enlisted in one colony, was boarded and returned to Australia, and then re-enlisted under a fresh name in another State. For this reason we used to answer question 24 "none", where a previous history could be obtained.²⁹ Such cases total 300, out of the 2,000 summarised, and after deducting 1,200 cases of pure traumatism the proportion is 300 out of 800.

We have been enabled to observe many cases that had been boarded and were kept in Hospital for an interval before clearing.

Shell-shock. In a number of severe cases with functional paralysis we have used anaesthesia and suggestion and are persuaded that though such cases are useless for active service they can, by careful tuition, promise to be of full service in a civil capacity.

Tachycardia. A large proportion of the cases were secondary; these cases of infective origin were slow of recovery.

Gastritis with persistent vomiting. There were many cases simulating gastric ulcer but having a functional basis. In some of these, where even rectal feeding had failed to break down the habit, when the patient was boarded, and considered himself free from further service, convalescence was unusually rapid.

Dysentery. Of all cases admitted there were only 3 of great gravity—2 of which were for hepatic abscess.

Nephritis. The table shows that 8 out of 32 cases have had a similar attack in civil life; it is, therefore, open to question as to whether such cases will not relapse on returning to the trenches.

All cases of *asthma* and *dislocated cartilage in the knee* are useless for further service.

Having in mind this general picture of the clinical problems of repair and re-enablement emerging from the final stage of wound healing or convalescence from disease, we may now examine the arrangements made for meeting these problems in the Australian force overseas.

The distinction made in England, even in the A.I.F., between the disposal of the "commissioned" officer³⁰ and of the rank and

²⁹ In the "Medical Report on an Invalid", [A.F.B.179] Question 24 reads:—"To what extent is his capacity for earning a full livelihood lessened at present?" The question arose as to whether it was intended to compare the invalid's present condition with his condition just before enlisting, or with that of a normal individual. At the end of the war the question was omitted from the Board Paper.

³⁰ The procedure for nurses differed in being more exactly *ad hoc*

file was so great as to make necessary a special account of each.

*The invaliding of officers.*³¹ From 1916 onwards Australian officers arriving from France went almost exclusively to No. 3

London General Hospital at Wandsworth.³²

**Disposal of
Australian
invalids**

During 1916 commissioned officers were boarded and disposed by the same machinery as dealt with the rank and file, though with somewhat greater latitude for alternative action. But in order to tighten up his hold on them early in 1917, with the approval of the G.O.C., A.I.F. and the Military Board, General Howse created a special sub-department of the office of his A.D.M.S. 3, with a Lieutenant-Quartermaster in charge, and thereafter kept this matter under his close personal supervision. The boarding and review of officers was carried out by the Consulting Physician and Surgeon in the officers' hospital or hostels, or at Horseferry Road. The board papers of all officers boarded for return to Australia had to be confirmed by the D.M.S. or his deputy and were closely scrutinised.

In this matter of "unfit" officers indeed Howse exercised a wide discretion. Officers found to be unfitted for front line work after repeated spells of duty at the Base, were sent to Australia "for change", which, in effect, meant home service in Australia or discharge from the A.I.F.

If Howse thought him [*i.e.* the repeatedly treated officer] useless, he sent him back [to Australia]. The officers' board was Howse's servant, and was used by him to serve a definite policy [*i.e.*] to preserve the fitness of the fighting personnel—"get rid of the unfit, keep the fit"; both principles were rigorously adhered to.³³

In the boarding of officers the D.M.S. worked in close touch with the A.A.G. at Australian Administrative Headquarters. Officers were categorised on less exact lines than the rank and file:

(1) fit for general service; (2) if "unfit", for how long? (3) fit for light duty; (4) if not fit, how long before likely to be so?

³¹ The following account is chiefly from notes by Capt. A. Charlesworth Q.M.2 in the office of the D.M.S., A.I.F.

³² This unit was closely identified with the A.I.F. from the beginning of the war. It was commanded throughout by Lieut.-Col. Bruce-Porter, R.A.M.C. (T.F.) who identified himself wholeheartedly with the Australian outlook and "reaction" to hospital life, and whose services call for appreciative recognition in the Medical History.

³³ Transcribed from notes made in 1922 on information supplied by Capt. Charlesworth.

The repatriation of invalid officers was based on:

- (a) No. 3 London General Hospital, Wandsworth ("cot cases").
- (b) The Australian "officers' convalescent hostels" (Welwyn Hall, Cobham Hall and Holland Park).
- (c) The Lord and Lady Harrowby furlough scheme for convalescent Australian officers.³⁴

The procedure for review and assembling for embarkation did not otherwise differ materially from that for other ranks.

The disposal of Australian casualties from British hospitals. The procedure with regard to Australians of "other ranks" while in British hospitals was exactly laid down in a comprehensive *Army Council Instruction*.³⁵ The general arrangements have been described in *Volume I*. But it must be noted here that the one purpose constantly before the medical department of Administrative Headquarters was to transfer the patients to the Australian Auxiliaries. This was found extremely difficult to achieve—medical officers in British hospitals disliked intensely any transfer for the purpose of policy and not of clinical advantage.

In 1918 Major Willcocks (A.D.M.S. 3) described the procedure as it then was:

Admission is notified by the British hospitals to A.I.F. Headquarters.

In British hospitals patients are sorted out, (if not before admission) as diagnosed (i.e. on the medical card), and are disposed of in accordance with *A.C.I. 434*, (the Army Council's Order) being sent to special hospitals if necessary.

Special cases. "A patient who is fit to travel as a sitting case, and who is not yet fit to be discharged to take furlough and go to a command depot, will be transferred, without boarding and without delay, provided accommodation is available, to one of the three following Australian Auxiliary Hospitals:

"No. 1 Australian Auxiliary Hospital, Harefield; No. 2 Australian Auxiliary Hospital, Southall, Middlesex; No. 3 Australian Auxiliary Hospital, Dartford.

in direct communication with the O.C. Hospital."

Hospital ship cases. "A patient unlikely to be fit for general service

³⁴ By this admirably conducted patriotic effort, initiated and carried out by Lord and Lady Harrowby and their family, convalescent Australian officers able to look after themselves were entertained as guests in English and Scotch country homes. All personal arrangements were made, and the register of hosts—some 241 in number—kept up-to-date by Lady Harrowby and her daughter—Lady Frances Ryder.

³⁵ No. 434 of March 1917. This was a pamphlet of eleven pages which dealt with every detail of general administration, transfer and disposal of Australians under treatment in British hospitals.

for six months, and fit to travel as a lying down case, will be immediately notified to D.M.S., A.I.F., London."

When this is done the D.M.S. requests the O.C. to transfer the case to No. 1 A.A.H. or No. 3 A.A.H., where the patient is retained and sent to Australia on a hospital ship, unless he becomes fit for discharge or transfer to a Command Depot before a hospital ship is available.³⁶ Hospital ships sail for Australia about once a month or less often.

Amputation cases. "All amputation cases when fit to travel will be sent to No. 2 Australian Auxiliary Hospital, Southall." Southall Hospital deals with all A.I.F. amputation cases when fit to be sent there.

Trachoma cases. "A patient diagnosed trachoma will be transferred to No. 1 Australian Auxiliary Hospital, Harefield." An A.I.F. Eye Specialist at No. 1 A.A.H. examines these cases and states whether he considers them to be infective or non-infective.

1. If infective they are treated at No. 1 A.A.H. until accommodation is arranged for them on an ambulance transport, and then are sent to No. 2 Command Depot to await (for a few days) embarkation. The senior medical officer is given definite instructions as to the treatment these men are to receive on the voyage. Semi-isolated accommodation is prepared and the patients have separate messing and washing accommodation.

2. If non-infective they are classified and, unless special treatment is required, are disposed of according to their classification as ordinary cases.

There seems to be much doubt as to when a case is or is not Trachoma, and when it is and is not infective, and the eye specialist was asked to be very certain before marking a case infective. A special report was required. Trachoma was getting to be well known and the number of men being sent to Australia was showing a tendency to increase. The highest total reached was probably about twenty a month (October to December 1917).

Dysentery. "A patient suffering from dysentery will, when fit to travel as a sitting case, be transferred to No. 1 A.A.H." These cases are diagnosed and treated at No. 1 A.A.H. If unlikely to become fit for general service and if they remain infective, they are returned to Australia as special cases, precautions being taken to prevent spread of infection on the ambulance transport.

Jaw and Face cases. "A patient suffering from an injury to jaw or face requiring operation will, when fit to travel sitting, be transferred to Queen's Hospital, Frogna, Sidcup."

Venereal Disease. "A patient found to have venereal disease, and who is fit to travel as a sitting case, is transferred to No. 1 Australian Dermatological Hospital, Bulford", where his treatment is completed. It has been found very desirable to get A.I.F. Venereal Disease patients to this hospital as soon as possible, as the treatment of V.D. except in special hospitals has not been satisfactory.

³⁶ In 1916 and 1917, it was the custom to take such cases direct from British hospitals to hospital ship by arrangements made by D.M.S., but it was found difficult to arrange administrative details so as to obtain a full embarkation of cases of hospital ship class.

Mental cases. "Will be transferred either to Lord Derby War Hospital, Warrington, or County of Middlesex War Hospital, Napsbury". When 20-60 A.I.F. mental cases are collected at these two hospitals, arrangements are made for their return to Australia under special arrangements.

Artificial Eyes Men requiring artificial eyes will be transferred to No. 1 A.A.H. when fit to travel sitting. These cases are fitted under the direction of an A.I.F. eye specialist at No. 1 A.A.H. A soldier blind in one eye is not sent to France unless at his own request.

Tubercular Disease. A patient having tubercular disease will be notified at once to the D.M.S., A.I.F. The D.M.S. requests transfer of the patient to No. 1 A.A.H. if fit to travel. If at No. 1 A.A.H. it is thought the patient is fit to travel sitting, he is sent to No. 2 Command Depot, where he has special care and is isolated until he is returned to Australia on ambulance transport. If unable to travel sitting, he is retained at No. 1 A.A.H. until a hospital ship is available to take him to Australia.

Considerable difficulty occurred in getting definite diagnoses of Tuberculosis (T.B.), and early in 1917 men who may not have had tuberculosis were sent back in the same isolated accommodation as those who were definite cases of tuberculosis. An arbitrary division was made between so called (1) infective cases, presenting *Bacillus Tuberculosis* in the sputum, and (2) non-infective, not presenting *Bacillus Tuberculosis* in the sputum after three to four tests.

Blind "A patient suffering from total loss of sight will be notified to the D.M.S., A.I.F." When fit to travel sitting, the patient is transferred at the request of the D.M.S., A.I.F. to No. 1 A.A.H., examined by an eye specialist and, if he recommends, sent to St. Dunstan's Hostel for Blinded Soldiers and Sailors, Regents Park. Patients are also sent there if blind in one eye and blind or nearly blind in the other. They are retained and trained at St. Dunstan's until that Hostel reports that they are fully trained, when they are sent to Australia on hospital ship.

In British hospitals. While in British hospitals, A.I.F. invalids do not come under the notice or administration of the A.I.F. unless for any of the reasons mentioned above, or on the following grounds:

1. *Seriously ill.* In which case they are notified to the O.C. Records Administrative Headquarters, A.I.F., London, who takes any steps necessary in notifying relatives, etc.

2. *Transfers.* . . . Transfers to Australian Auxiliary Hospitals from British hospitals are encouraged in every way. Transfers from one British hospital to another, unless a matter of military necessity, must be approved by the D.M.S., A.I.F., and the transfer arranged by Commanding Officers of Hospitals direct. . . .

Transport. The A.I.F. is not directly concerned with the transport of cases being transferred unless they pass through London. . . .

Speeding up transfers. A weekly return is made to D.M.S., A.I.F., by O.C. Records of the numbers in British and Australian hospitals. Once a month a return is made by O.C. Records of patients who have been more than three months in hospital. The D.M.S. enquires regarding these cases, and tries to arrange transfers as soon as fit. The aim is to keep Australian Auxiliary Hospitals full and working at highest capacity.

When there are very large numbers of A.I.F. patients in British hospitals, e.g. from 8,000 upwards, there is some difficulty in accommodating all available A.I.F. patients in Australian Auxiliary Hospitals, but usually the opposite is the case. It is difficult to get British hospitals to transfer to Australian Auxiliary Hospitals as soon as invalids are fit to travel sitting.

This is dealt with—

1. By sending A.I.F. Consultants to personally visit and see all patients in British hospitals, containing the largest numbers. Generally in these cases it is found that a large percentage, up to 70 or 80 per cent., can be immediately transferred to Australian Auxiliary Hospitals.

2. By letters to D.G.M.S., D.D.M.S. Commands, and Commanding Officers of Hospitals containing the largest number of A.I.F. patients.

A.I.F. Consultant Physicians and Surgeons visit British hospitals periodically to see all A.I.F. patients and if possible arrange their transfer to Australian Auxiliary Hospitals.

Complaints from A.I.F. patients in hospital are dealt with as circumstances indicate. Usually every endeavour is made to have the patient transferred to an A.A.H. as soon as possible. This saves friction and satisfies the patient in most cases. There have, however, been few complaints.

Australian Red Cross, and other visitors interesting themselves in A.I.F. invalids, sometimes bring matters to the notice of the D.M.S. which pertain to A.I.F. invalids. The Red Cross visitors have indeed been the most constant check, as they are independent of military control and do not hesitate to see that patients are fairly dealt with and given every consideration.

Deaths in hospital, are notified to Administrative Headquarters, A.I.F.

The three Australian Auxiliary Hospitals played a remarkable and very interesting part in A.I.F. history. They were in effect the instruments of national policy rather than of professional responsibility; and when it is recalled that they were the whole Australian counterpart to the immense hospital system of Canada³⁷ the profound difference in the policy of the two dominions will be appreciated.

That the history of Harefield Hospital presents itself chiefly as a warning is a statement of fact, and not a criticism of its conduct. Its origin, in a patriotic gesture, its early history as a small convalescent home, and its development during 1915 as a normal "Auxiliary", were natural developments of the British hospitals system in England, and were effected with the approval and

The Australian Auxiliaries

No. 1, Harefield

³⁷ See Vol II, pp 825 and 826n

co-operation of the War Office. But when in 1915³⁸ it was proposed to increase its capacity to 1,000 beds and make it a General Hospital for primary admissions, and the War Office substituted for this its own scheme of co-operation, No. 1 A.A.H. began to develop in accordance with vicissitudes of policy rather than with a defined clinical purpose. The War Office decided that Harefield was unsuited as the site of a major hospital, but by irregular accretions, functional and structural, it grew to a large and unwieldy unit disadvantageously situated, expensive, awkward to work, difficult to command, an example of casual improvisation. With the evolution in 1916 of the "six months' policy" it became with the other two auxiliaries more and more completely an implement of administration rather than of clinical enterprise.

So much for the political side of the history of this first Australian hospital formed in England; the reverse of the picture, the professional side, is wholly admirable. In command and administration it gradually evolved an effective discipline on the Australian model—*i.e.* based on a commonsense recognition of its purpose.³⁹ On the clinical side Harefield played a great variety of parts in the varied history of the Force.

Medical officers at the front sometimes spoke contemptuously of the Auxiliaries—until their eyes were opened by transfer to one of them.⁴⁰

The following is a note upon the surgical work at Harefield.

Surgery at Harefield. The life of the surgeons at Harefield was laborious and the work difficult and unsatisfying, and its importance has hardly received the recognition which it deserved. The cases came in unending streams from the British hospitals, every kind of war injury in all stages of repair or breakdown and showing evidence of most diverse quality in previous treatment. Patients were never received direct from overseas but always after a longer or shorter time in British hospitals, primary and secondary; and their stay at Harefield was determined chiefly by the facilities for overseas transport—hospital ships and ambulance transports. As with No. 3 Auxiliary,

³⁸ See Vol. I Chap. xxiii.

³⁹ "The Australian soldier felt that at Harefield he was at home—and one of the prerogatives of home is a latch-key" (quoted from some notes on the early history of Harefield). The hospital owed much, as did medicine in Australia, to the officer who commanded the unit during 1916-17, Lieut.-Col. W. T. Hayward.

⁴⁰ Lieut.-Col. D. A. Cameron, an officer whose early work at Harefield on the problem of artificial limbs was of outstanding merit, notes that experienced officers transferred from France considered the work in the Auxiliaries even more difficult than in hospitals at the seat of war.

especially in 1917-1918, "Harefield" was a clearing centre, a staging place, the professional work dominated by the remorseless drive for onward movement.

Owing to this rapid transfer of patients from the British hospitals there was much operative work. An average surgeon's day in periods of stress would involve 10 or even up to 20 major operations, apart from a vast amount of routine work.

For the surgeons especially, it was professionally exasperating to have to send on a case—*e.g.* of nerve, bone, or tendon injury—with a campaign of treatment incomplete, and without being able to follow up or to influence its further course.

From the point of view of the patient, and, not less, from that of such national commitments as those for pensions and reinstatement, justification for the policy itself, and for the uncompromising character of its execution, was based on the necessity for some sort of continuity of treatment during the process of return to Australia. Success depended on the insight and efficiency of the preparations made there for meeting the responsibilities imposed by the policy; in particular that medical officers in Australia should keep abreast with the advance of knowledge and possibilities, both surgical and medical, of war surgery.

Harefield was the headquarters of the Australian specialists on eye, ear, nose and throat and the consulting radiologist. It was the chief centre for the Australian Service of qualified specialists in massage.

The following figures give some indication of the work carried out at this hospital:

No. 1 A.A.H. (Harefield).

1916

Admissions—

From Egypt and Gallipoli, 1.1.16—31.5.16	1,548
From B.E.F. and U.K., 1.6.16—31.12.16	8,539
Total	10,087

Discharges—

To No. 1 Command Depot, Perham Downs	1,099
To No. 2 " " Weymouth	5,183
To No. 4 " " Wareham	280
To Convalescent Depot, Epsom	771
R.T.A. per H. Ship and Transports	1,072
Sundry discharges	1,176
Total	9,581

Deaths	10
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1917

Admissions	14,651
Discharges	(Not available)	
Deaths	26

1918

Admissions (19,122 from B.E.F.)	21,472
Discharges—								
To Com. Depots after furlough	..	..	..	..	..	..	..	9,248
Direct to Com. Depots	..	..	..	..	..	..	..	8,409
To other hospitals	..	..	..	..	..	..	..	304
R.T.A.	..	..	..	..	..	..	..	1,251
Sundries	..	..	..	..	..	..	..	2,252
Total	..	..	..	..	..	..	..	21,464
Deaths	..	..	..	..	..	..	..	53

1919

Admissions	..	..	..	..	..	..	..	72
Discharges	..	..	..	..	..	..	..	691
Deaths	..	..	..	..	..	..	..	3

The number of cases boarded at Harefield in 1916 was 3,661, but by 1918 the yearly total had risen to 7,473, of which 4,927 were surgical cases and 2,546 medical. The average number of patients in hospital that year was 816.

Between the 2nd June, 1915, when the first patient was admitted at Harefield Park, till the end of January 1919, when admissions ceased, some 50,000 patients passed through. Of this number between 4,000 and 5,000 were returned to Australia by hospital ships for further treatment.

Only 98 patients died at Harefield, a large number of the fatalities were due to the influenza epidemic in 1918. The average number of medical officers in residence was 18. Sisters and Staff Nurses numbered 70. Some 120 "V.A.D's", chiefly Australians in the British service, were employed through the A.R.C.S. The general staff averaged 100.

The only other Australian unit which filled a general clinical purpose was No. 3 Auxiliary at Dartford. This hospital, which was formed in 1916 from No. 1 Australian Stationary Hospital, differed from Harefield in having been deliberately established as a clearing hospital between the British General Hospital system and the Australian Command Depots and Hospital Ships. It opened on 9th October 1916 ready for 1,000 patients and by the end of October had 1,400 beds. The senior physician here, Colonel Springthorpe, was a stout critic of the six months' policy. He wrote:

**No. 3 A.A.H.,
Dartford**



22. MASSAGE ROOM AT MONTE VIDEO CAMP, No 2 COMMAND DEPOT,
WEYMOUTH, 1918

Masseurs at work on invalids "boarded" for return to Australia.

Aust War Memorial Official Photo No D310



23. MASSAGE WARD AT REPATRIATION GENERAL HOSPITAL, ROSEMOUNT,
QUEENSLAND

Masseuses at work on invalids after their return to Australia

Photo from the Department of Agriculture and Stock, Queensland
Aust War Memorial Collection No H2258

To face p 652



24. FITTING AN ARTIFICIAL LEG AT NO 2 AUSTRALIAN AUXILIARY HOSPITAL, SOUTHALL

Aust War Memorial Official Photo No D571



25. THE CONVALESCENT HOME FOR AUSTRALIAN NURSES AT ST. ALBANS, ENGLAND

This house (the residence of Mr McIlraith) was one of a number lent to the A.I.F. by their owners

*Photo from Sister C A Stone
Aust War Memorial Collection No H16414*

To face p 653.

We had an excellent hospital—well furnished and well equipped. . . . Not far away were another hospital occupied by the British, and buildings afterwards used by the Americans for a 2,000 bed hospital. We could have obtained two, if not all three, of these and thus had a series like the British, Canadians and French. Unfortunately, we had no General Hospitals in England, our other auxiliaries, not so good as ours, were equally isolated, and our convalescent camp at Weymouth had the disadvantage of being transit stations to the hospital transports. . . .

After describing the case of an Australian psycho-neurotic patient to illustrate his argument, he continues:

This case—typical of others—illustrates (a) the long stay in non-Australian hospitals, (b) the variety of diagnoses and want of recognised terminology amongst experts, and (c) the disregard by our authorities of our own hospitals. For the last eight months the "move on" claim was put in operation; in June, 1918, I reported these conditions to both D.M.S. and D.G.M.S. as "not calculated to do the best for the men, make the best use of the staff, or consistent with the dignity of the Commonwealth".

The reasons that actuated the Australian "authorities" here castigated have already been discussed.⁴¹ That in spite of these handicaps much good clinical work was done here is endorsed by the study of nerve-suture, by Major Alan Newton, given in Chapter VI. A statistical summary of the work is given here:

No. 3 A.A.H., Dartford

				Admissions.	Discharges.	Deaths
Oct.-Dec.						
1916	..	..	..	4,297	3,240	1
1917	..	..	..	25,094	25,336	5
1918	..	..	..	27,115	27,050	24
1919	..	..	..	6,472	7,352	42
Total Oct. 16 till Aug. 19	..	..	..	62,978	62,978	72

The method of disposal is illustrated in the following summary for the year 1918:

To No. 1 Command Depot	..	..	..	87
To No. 2 Command Depot	..	..	..	3,742
To No. 3 Command Depot	..	..	..	7,253
To No. 4 Command Depot	..	..	..	1,284
To Australia .. .. .	..	..	..	895
Deaths .. .. .	..	..	..	24
Furlough, other hospitals, etc.	..	..	..	13,765
				<hr/> 27,050

⁴¹ In this chapter. See also *Vol. I*, pp. 506 and *Vol. II*, p. 325 *et seq.*

Towards the end of 1916 the problem of artificial limbs became a pressing one. The Australian surgeons at Harefield⁴² were perturbed to find that they were expected to adjust their surgery to the requirements of the limb-maker; in particular for artificial legs to lop the limbs to fit a procrustean socket. Meanwhile in Australia the Director-General had become involved in a confused and embarrassing situation as the result of a decision made in June 1915⁴³ that the responsibility for the "re-education of cripples" should be left to indiscriminate private benevolence, and that "second thoughts" found a rush of limbless of dimensions too great for the resources of the Defence Department. The hitch came with the adoption of the "six months' policy". The history of "orthopaedic" repair and artificial limbs in Australia belongs to a later chapter. Its relevance here lies in the fact that it compelled the one significant departure from the "six months' policy", and brought about the creation of an important Australian secondary hospital and clinic in Great Britain. Its history has been summarised as follows:

On 4th August 1916 the St. Marylebone Orphanage Schools located on some 5 acres of land at Southall, 8 miles from London, were taken over by the A.I.F. Initial preparations were made for about 250 patients and within a month of occupation arrangements were made to increase the accommodation to 500 beds. Patients were first admitted on 1st September 1916.

Southall functioned in the first instance as a supplementary Auxiliary to No. 1 at Harefield, but in November 1916, it having become clear to the D.M.S. that the fitting of artificial limbs required a special institution, the hospital began to specialise in that task.

No. 2 A.A.H., Southall

The admissions were—

1916	3,991
1917	6,213
1918	2,931

The total number of artificial limbs fitted at Southall up to January 1919 was approximately 1,074. These were made up as follows:

⁴² Fay Maclure, Gordon Shaw, D. A. Cameron

⁴³ Vol I, p. 539.

<i>Legs</i>		<i>Arms.</i>	
Essential	.. .. 490	Carnes	.. .. 16
Masters	.. .. 169	Anderson	.. .. 56
Ernst	.. .. 200	Hobbs	.. .. 13
Allen & Hanbury	.. .. 29	Ferris	.. .. 3
Grossmith	.. .. 10	Blatchford	.. .. 25
Rowley	.. .. 42	Cauet	.. .. 4
Hangar	.. .. 11	Adams	.. .. 1
Pomeroy	.. .. 3		
Pedestros	.. .. 2		
<hr/>		<hr/>	
956		118 Total 1,074	

These figures do not include those fitted with temporary replacements. (Approximately 180 of 355 unfitted who returned to Australia during 1918 had temporary replacements.)

The number of men with amputations returned from England to Australia up to January 1919 was—

	<i>Legs.</i>	<i>Arms.</i>	
Fitted	.. .. 915	116	
Unfitted	.. .. 504	438	
	<hr/>	<hr/>	
	1,419	554	Total 1,973

In January 1919 there were in No. 2 A.A.H. 475 amputation cases; about 130 others were outstanding, and there had returned to Australia approximately 1,973.

The total number dealt with by No. 2 A.A.H. was therefore about 2,578.

By adding to the above the number sent back to Australia direct from Egypt and from No. 2 Command Depot, and officers sent without going through Southall, it may be estimated that the total number of officers and men of the A.I.F. fitted with artificial limbs was about 3,000.

The other great centre for the reparative and interim treatment of Australian invalids in England was "No. 2 Command Depot", and the history of invaliding in the A.I.F. is in a great measure the history of this depot. Its part in the first year of the war and in the A.I.F. Depot system have been indicated in the previous volumes. Only gradually, as the procedure crystallised in a scientific system of discrimination, treatment and disposal, did the depot become entirely devoted to the "over six months" categories. Until the end of 1917, indeed, it dealt with "unfits" of every category, including those who had to be

⁴⁴ This account of the Depot is taken chiefly from an admirable report on "Organisation and Medical Administration of No. 2 Command Depot", 1st June to 31st Dec, 1918, by Maj. Betts, S.M.O from 27 March 1918 to 8 May 1919.

re-hardened for further service at the front. But by the end of 1917 the *vis a tergo* of the invalids from the Somme, Arras and Flanders offensives, together with the enthusiastic campaign by the A.D.M.S. and his S.M.O.'s for a high standard in interim and reparative treatment in soldiers awaiting repatriation, led to the exclusion of the temporary unfit classes (B1a and B1b) which henceforth went to No. 4 Command Depot. This move, as the S.M.O., Major L. O. Betts, reported, was

of the utmost advantage it has made an enormous difference to the work of the medical staff. The large amount of classification and re-classification, and its consequent boarding and the endless incoming and outgoing drafts of these men has ceased, and the staff can now almost wholly devote its time to treatment [*i.e.* of invalids awaiting embarkation].

In its final development the functions of this great camp are described as follows:

Although nominally a Command Depot, and organised as such, its function was in effect that of a Convalescent Camp, Invaliding Depot, and Auxiliary Hospital combined. All cases of B1b, C1, B2b, C2 and C3 classes fit to live in hutted camps, and who could be treated by daily dressings, massage, electrical and gymnastic treatment on out-patient lines, were transferred from the Auxiliary Hospitals hither, as well as from the other Command Depots and even from training groups in the Salisbury area.

The total accommodation at the end of 1916 was 2,240, all in one camp at Monte Video, 2 miles from Weymouth. During the ensuing year three other camps near by, at Westham, Verne Barracks, and Littlemore, were taken over, and organised into sub-depots. During this period of expansion the depot was always on the verge of over-crowding—and often did become overcrowded just before the departure of a convoy relieved the pressure.

A graph supplied by Major Betts shows that in 1917, though the hut accommodation increased from a capacity for 2,200 up to provision for 7,700, being assisted during the summer by tents for over 2,000, the depot was overcrowded by some 700 at the beginning and 750 at the end of April, by over 1,000 in June and again in August, by 600 and 1,500 in September and 600 in October, the number of men in camp dropping to within the limits of accommodation whenever men were shipped, but quickly rising again to exceed it.

Structure. On the strength of progressive experience the sub-depots were gradually organised to serve the needs of special types of disability; ultimately each sub-depot became functionally self-contained under a distinct staff. For convenience of working each sub-depot was organised in four "companies". The local administrative headquarters was at Westham, where new arrivals were classified by the S.M.O. for distribution to the sub-depots, the criterion being partly the category set by the Medical Board, partly the medical condition of the invalid at the moment.

Structure and functions of No. 2 Command Depot

The camps were all of the usual hutted type.⁴⁵ The men slept on the old type of barrack bed, but 2,336 hospital beds were supplied for the worst type of case. A camp hospital was attached to each of the three main sub-depots, the one at Monte Video Camp being staffed by female nurses of the A.A.N.S. For the most part however, serious cases went to the A.A.M.C. hospital in Weymouth.

The special functions of this depot are summarised in Major Betts's report as :

(1) the care and treatment, and if necessary re-grading, of all invalids, (other than those retained in hospital) while awaiting embarkation to Australia. (2) Completion of board papers and keeping of records, etc., preparatory to the later embarkation of these invalids. (3) Reception and retention of surplus Home Service personnel (i) employed in England, (ii) invalided to Australia.

Functions of the depot

Besides the routine duty, common to any great camp, of preventing infectious disease and of treating intercurrent illness, some special duties fell to the medical staff of this depot: (1) the initiation, supervision and control of such remedial and reparative work as circumstances would permit for the various types of disabled men awaiting embarkation; (2) the training of combatant B class men to carry out this remedial work and (after November 1917) of A.A.M.C. Orderlies for the same purpose; (3) the systematic examination of all categorised men in the depot and when necessary their re-grading, upward or downward; and (4) the selection of suitable invalids for

The medical staff

⁴⁵ Verne Camp was at first in the old barracks, but these were soon given up.

embarkation, and the consequent preparation of boat rolls and other procedures associated with embarkation.

The orderly movement of individual soldiers or of bodies of men into, out of, or through medical control involved heavy and continuous clerical labours for which the medical service was wholly dependent on efficient office work. The maintenance of accurate personal records was the foundation of the pensioning system. At No. 2 Command Depot the clerical work involved (1) the co-ordination of the various procedures consequential on the receipt of instructions to provide a draft of invalids, of various specified types, for inclusion in the "boat roll" of a hospital ship or an invalid transport, and (2) the maintenance of permanent records of invalids and of the proceedings of medical boards.

**Clerical
work**

Remedial and reparative treatment. Much that was done in the way of "treatment" was largely mechanical and intended chiefly for men whose disability, though of sufficient gravity to lead to their being boarded as invalids of the "temporary" class (B2), was of such a nature that with treatment they might be graded to the B1 category ("unlikely to be fit for duty in less than 3 months") and transferred to the active service depots (Nos. 3 or 4). For these men gymnastics, gardening, graded marches and so forth were arranged.

**Remedial
treatment**

In the development of this type of simple, non-technical reparative treatment No. 2 was behind the other depots. But for the fully convalescent invalids awaiting embarkation to Australia there was developed a system of medical and semi-medical treatment designed deliberately to continue the treatment begun in the Auxiliary Hospitals, and pave the way for a systematic campaign of treatment in Australia.

Training medical orderlies. At the end of 1917, when freed from the task of dealing with B1 men, the medical staff of the depot took in hand the systematic training of personnel both A.A.M.C. and combatant, to carry out this interim treatment both in the depot and on board the transport.⁴⁶ The combatants

⁴⁶ The move was initiated earlier in the year corresponding with suggestions in this direction from Australia. (*See Chap. xv.*)

were trained in the simple duties required of medical orderlies in the transports. The A.A.M.C. men for these vessels were trained for special duties in connection with orthopaedic, tubercular, mental and other invalids: when each voyage ended and the purpose of each staff had been duly served, its members were discharged in Australia.

From hospital	In the depot	On the transport	In Australia
A.A.M.C. men of B2 and C class, on recovery from wounds or sickness, were selected to reform the staff to accompany the invalids.	This staff of B class men was trained for each transport; it worked with the invalids whom it was to accompany and embarked with them.	With full equipment, this staff carries out on board ship the treatment commenced in the depot.	In Australia is discharged in its several home States.

While each staff and its invalids were proceeding homewards, back in the depot the same unending tedious round has begun—selection, training, and practice, in preparation for the next “convoy”. No. 2 Command Depot was indeed the executive centre of invaliding just as A.I.F. Headquarters, London, was the administrative centre. Only (as Lieut.-Colonel Anderson⁴⁷ says) “by constant and terrific energy”, and by adjustment of duties “worked out to a decimal point”, did the work in this and the re-training depots keep up with the stream of men passing through, “Colonel McWhae always outside, seeing everything, noting the work of each man, Beamish⁴⁸ never away from the office”.

No. 2 Command Depot came in fact to act as a substitute for a convalescent hospital—it was a combination of convalescent hospital and invaliding depot. The A.D.M.S. and his capable and enthusiastic officers, Major Betts, Captain E. B. Thomas and others, and their wholehearted band of assistants, built up a system of orthopaedic treatment “while you wait”—the only kind possible in the circumstances—*which actually saved the invalid Australian soldier from serious detriment by the “six months’ policy”*. Captain Thomas writes:

⁴⁷ A.D.M.S. 1 on Gen Howse's staff

⁴⁸ Maj. F. T. Beamish, his D.A.D.M.S., A.I.F. Depots in U.K.

Colonel McWhae, an enthusiast, worked very hard to make the Monte Video Department as good as any in the English hospitals. His idea was to see that the wounded awaiting embarkation should have proper treatment. Many had to wait for long periods, sometimes three months, and it was just as essential that during that time their stiff joints and paralysed muscles should have attention as that their wounds should be dressed. During the first six months of my stay at the Camp many patients came direct from the British hospitals in a very neglected condition. Nerve wounds with no attempt to correct resultant deformity such as dropped wrist, etc., splints left on after fractures had united, with stiff joints and so on. Scores of wounded arrived needing very essential treatment, and this had to be given at once. It could not be left until these men returned to Australia. . . . Though the organisation built up was very far from perfect there is no doubt that a lot of good work was done there. Massage certainly helped these wounded men. The mere fact of having an interest taken in their disabled limbs, making them exercise and move their weakened muscles and stiffened joints . . . helped them on the road to recovery.

It is not open to question—nor was it questioned at the time—that for many impaired men this was at best a “mark-time” procedure; limbs were massaged, muscles were faradised, where a campaign of operations was the proper treatment. “Possibly”, wrote Colonel McWhae in 1919, “an Australian Orthopaedic Hospital might have been of value, but such a hospital, owing to pressure of cases, could only have been an evacuating unit and could have done little more than was done at Weymouth because, if patients had been delayed in England for treatment several orthopaedic hospitals, and not one, would have been necessary. The policy of the A.I.F. was bound up with the treatment of orthopaedic patients in Australia, which undoubtedly was the correct place for the prolonged orthopaedic procedures to be carried out. Whether such treatment was thoroughly organised at this period of the war I am unable to say.”

The full answer to this important question belongs to the next two chapters. A bitter attack on the whole organisation for after treatment has been made.⁴⁹ The personal conclusion of the present writer is that—quite irrespective of the *fait accompli* created in 1915 by the formulation of the “three months’ policy”, changed in 1916 to the “six months’ policy”—in view of (1) the naval and national situation, (2) the grave menace of sepsis if reparative operation were undertaken

⁴⁹ By Maj. Syme Johnson, *see Chap. xv.*

too soon after healing, and (3) of the prolonged and essentially personal nature of the "campaign" of repair if success were to be assured (in any but the simplest type of disablement) the organisation was well conceived and the scheme effectively implemented.

D.M.S.'s provision for continuity of treatment. Further, having in view the need for making available to the D.G.M.S. in Australia medical officers capable of organising and directing there the reparative treatment of wounded men, at the end of 1917 General Howse arranged that carefully selected medical officers from each State, with a wide experience of war surgery, should receive special training in the British orthopaedic hospitals, and be given opportunity to visit continental clinics.

The selection from the various types, medical and surgical, of invalids held in the depot or in the Auxiliaries to fit the accommodation in the available transports, their assembling and allocation to a "boat roll", and the despatch of drafts to arrive at the port of departure exactly on time, demanded the closest co-operation between (a) the staff of No. 2 Command Depot, (b) the reviewing boards, and (c) the staffs of the departments of Australian Administrative Headquarters concerned in the movement of invalids. The composition of the drafts and formation of "boat rolls" was decided automatically by the nature of the ship—whether hospital ship ("white ship") or "hospital (or invalid) transport" ("black ship"). The former took patients who would require special nursing and treatment on the voyage, the latter chiefly men whose condition had reached a stage of comparative stability, or who did not require constant or skilled medical supervision, and nursing. The selection from among the officers and men of the "invalid" categories (C2, C3 and B2b) scattered throughout the British and Australian hospitals, and in No. 2 Command Depot, of drafts to fill the vessels was the business of the hospital, the Depot staff, and the reviewing boards, final decision in every instance being made by the senior reviewing board. The staff for the "hospital transports" was drawn from (a) officers

**Sea
transport**

and other ranks who, for various reasons, were returning to Australia. (b) The "sea transport sections".

The fact that the drafts must, within narrow limits, *suit the ship*, and not vice versa, made necessary the closest and most continuous oversight of the "invalid" situation in England. The procedure adopted is thus described:⁵⁰

**The
boat roll**

From the end of 1917 weekly returns were required from the Auxiliaries and Command Depots of the number of invalids awaiting return to Australia. This showed the number of cot, double-tier (upper and lower) and hammock cases, tuberculars and trachomas; the situation as to artificial replacements; and whether "recovered" or not.⁵¹ Based on these various reports and returns a more or less standardised procedure was worked out somewhat as follows:

From the *Australian Naval Transport Officer*, Commander Parker, would come a message to the *Shipping Officer for Transport at A.I.F. Headquarters*, Lieutenant Perrin, that a vessel was expected to arrive in 6 or 8 weeks—say, about July. This information would be handed to the *A.D.M.S.* 3, Major Jeffries, or he would probably get it first, as he kept in close touch with the *A.I.F. Shipping Department*. Preparations would begin—*A.D.M.S.* 1 to consider what staff he would have of Medical Officers to be returned invalided, or on special duty, or returning for various special reasons, of whom there were always a number endeavouring to obtain their return; or possibly a sea transport section would turn up from Australia, and would be earmarked for that vessel, if not too far ahead. It was very seldom that we had word from Australia as to what vessels were to be expected and when.

The A.D.M.S. A.I.F. Depots in U.K., Colonel McWhae, at his weekly visit [to the D.M.S.] would give his opinion as regards the numbers, and various classes, of invalids awaiting return—orthopaedics, mental, tuberculars, or ordinary cases. . . . In the meantime, the dates would become more clearly definite by the Shipping Department—"July"—"early July"—"5th July", and so on. As soon as the vessel arrived precise information would be available from inspection by Jeffries, and decision would be made as to what class of cases were to go, and therefore the class of fittings required, depending, first, on the type of ship, and secondly on McWhae's requirements as regards the invalids waiting. The vessel would then be handed over to the *fitters*, and McWhae would set to work to actually pick his invalids, in accordance with the decision arrived at as to the class that would be sent by the particular vessel. *The D.M.S.* would commence to assemble his medical officers and arrange for a S.M.O., and McWhae and his *A.D.M.S.* 1 together would assemble the personnel, other ranks, nurses, etc., according to circumstances.

⁵⁰ Mainly from a statement by Lieut.-Col J. H. Anderson

⁵¹ Thus, for the week ending 11 Jan 1918 the Auxiliaries reported 61 cot and 679 D.T.B. cases; No. 2 Command Depot 729 D.T.B. and 3,628 hammock cases, and 48 tuberculars,

Board papers (*A.F.B. 179*) and—when available—the medical history sheet (*A.F.B. 178*) were sent to the D.M.S. at Horseferry Road, and from them the Marine Transport Section of Administrative Headquarters prepared a *provisional boat roll*. Only men who could travel by train as “sitting” cases were selected for invalid carrier—all cot cases went by Australian hospital ship. Medical stores, technical and other, for the voyage, assembled from the Australian Base Depot of Medical Stores in London, were sent to the ship as soon as she arrived in dock at the port of embarkation, Plymouth, Avonmouth or Devonport; medical officers were warned and assembled from their leave address or from Australian Auxiliary Hospital or No. 2 Command Depot.

With notice of time of departure of the hospital ship or “convoy” the various buttons were pressed at administrative headquarters that set in motion drafts of patients from the various sources. They were entrained under suitable escort—commonly the staff for the voyage—for embarkation at the ports named. The “S.M.O.” for the voyage and his medical staff would as a rule be at the port 48 hours before them.

**Embarkation
of invalids**

Invariably, the elaborate details of these moves were carried out to schedule time: rarely did a ship embark more than one man short. Embarkation of a thousand invalids arriving by trains at the dock was accomplished in 3-4 hours, usually between 2.30 and 6 p.m.

The constant adherence to a clear policy of immediate return to Australia of all “invalids”, unimpeded by delay in treatment in England, together with effective co-operation between Australian administrative headquarters and the British Admiralty enabled Australia to command a steady supply of transports fitted up to her exacting requirements, for invalid transport. The secret of this success lay in this fact that *never was there any delay on the part of the A.I.F. in taking advantage of any transport that might be made available by the Admiralty*. It was a matter of honour in the Administrative Headquarters at Horseferry Road to allow nothing to delay the preparation of the transports made available by the Admiralty or their departure exactly to schedule. The shipping authorities and the British

Admiralty knew that, however precise and exacting the Australian authorities might be in the matter of cubic space and fittings of transports for the Australian invalid, the high standard of accommodation demanded was backed on her part by an equally high standard of administrative and executive action in the use made of it.

This service of invalid transport to Australia, undoubtedly a high-light of the medical war effort, and one in which Imperial co-operation was most effectively achieved, is the subject of the next chapter.⁵²

⁵² How dominating was the insistence on *movement* is illustrated in the following statement by Maj. L. O. Betts, of the only "legitimate causes that may lead to an 'Australia class' invalid having been in No. 2 Command Depot for three months or longer":

- (1) Lack of accommodation of special type required on invalid carriers (*e.g.* Carriers may be taking only hammock cases, or only Victoria or N.S. Wales cases, or limited number only of berth cases, etc.). Sgts. also have limited accommodation.
- (2) Invalid carriers having sailed in an order very different from that in which nominal rolls were called for and prepared (*e.g.* "R" rolls were submitted 13-18/11/17, "S" rolls on 27/11/17, "T" rolls on 3-5/12/17, whereas "T" sailed 20/12/17, and "R" on 21/12/17, while "S" is stated to be leaving early in January 1918.)
- (3) Sailing of an invalid carrier having been cancelled after submission of rolls, and names transferred to the roll of a later carrier (*e.g.* original nominal rolls for "J" were submitted on 8 August 1917; this roll was subsequently cancelled and all berth cases transferred to "K", which embarked on 18 October. Thus 200 men who had already been in the depot for varying lengths of time before their names were in turn submitted for embarkation, were held a further 2½ months before embarking.)
- (4) Invalid having been originally in a higher category, or profitably employed on Home Service, and later having been revised and placed in Australia-Class category, or notified as being no longer employed.
- (5) Invalid having been in hospital, a contact of infectious disease, deleted on final medical inspection (for V.D., Scabies, etc.), held as a witness for D.C.M., etc., and so unable to embark at time of departure of invalid carrier, by which otherwise he would have been evacuated.
- (6) Invalid having applied for his discharge in England
- (7) Invalid having been held off boat roll under particular instructions from A.I.F. Administrative Headquarters, or G.O.C., A.I.F. Depots in U.K.
- (8) Invalid having been absent without leave at time he should have embarked.

CHAPTER XIV

SEA TRANSPORT OF AUSTRALIAN SOLDIERS

THE sea transport of invalids from England to Australia is the main subject of this chapter. The problems of their transport from Egypt and England during and after the Gallipoli Campaign, and from Egypt during the operations in Sinai and Palestine have already been described.¹ The present narrative tells of the problem of their shipment from the Western theatre of war during 1916-19. But it also has to deal with the medical problems of repatriating the whole of the troops at the end of the war, fit men and their wives, babies and sweethearts.

But the transports that took invalids from England to Australia usually returned with reinforcements from Australia. Thus the carriage of these reinforcements, so far as the medical service was concerned—which it was, deeply—also naturally comes into the subject.

In May of 1916 the severity of the submarine campaign in the Mediterranean made it necessary for Australian and also

The Cape route

New Zealand transports to England to go round the Cape of Good Hope, instead of by Suez, invalids from England also returning by that route. Troopships thenceforth called regularly at the ports of Durban, Cape Town and Sierra Leone. Medically South Africa became a half-way house in the eight weeks' voyage. On May 25th, on a recommendation by the D.G.M.S. in Australia, a cable was despatched to the Governor-General for South Africa asking whether the Union Government would make arrangements for the care of sick Australian soldiers whom it might be necessary to put ashore, or if it would be necessary to send an A.A.M.C. unit. On June 3rd the Governor-General of South Africa replied as follows:

There will be no difficulty in making arrangements at Cape Town for

¹ See *Vol. I*, pp. 499 *et seq.*, and pp. 756, 777. The original transport of the first force to Egypt was described in *Vol. I*, pp. 34 *et seq.*, 531.

receiving into the military hospitals there any sick or wounded whom it may be desired to land for treatment and it will not be necessary to provide any medical personnel. Such arrangements have already been made in the case of invalid troops returning to New Zealand and Ministers are assured that G.O.C., S.A. and Military Commandant at Cape Town will be very glad to give every facility to Australian invalid troops.

Accordingly the ships landed any serious case for treatment and picked up recovered cases. An extensive military traffic grew up. Lieutenant and Q.M. R. M. Beveridge was appointed to charge of an "A.I.F. Depot in South Africa". Nos. 1 and 2 S.A. General Hospitals (Home Service) at Wynberg and Maitland treated large numbers of Australian patients. In all, as shown below, 78 deaths occurred. It will be noted that the majority were from cerebro-spinal fever and pneumonic influenza.

DEATHS AT SOUTH AFRICA

Influenza	23	Erysipelas	1
C.S.F.	20	Alcoholism	1
Pneumonia	13	S.I.W.	1
Broncho-pneumonia	6	Appendicitis	1
T.B. Lung	6	Valvular disease	1
Influenza and pneumonia ..	1	Aneurysm	1
Measles and broncho-pneumonia	1	Other causes	1
Bronchitis	1	Total	78

In the matter of quarantine important dealings occurred as will presently be explained between the medical authorities of the two countries. Their social relations centred in the unique and successful activities of Miss **Social and national** Ethel Campbell of Durban who met every troopship and, in the records of the A.I.F. stands out with Mrs. Chisholm and Miss McPhillamy of Kantara and other "voluntary" workers, beside Simpson, "the Man with the Donkey",² as embodying the spirit of humanity, kindness, and decency in human life and human relations, for the preservation of which this "gallant company" and its Allies fought and is again fighting.

Yet it is important to recall that medical records show Miss Campbell and Durban to be only a focal point of memory for the unlimited kindness of the people of South Africa.

² Pte. J. S. Kirkpatrick, *see* Vol. I, p. 159.

The personnel (says Lieut.-Colonel T. G. Wilson) had always a chance to get ashore at the various ports, and so got quite to know the various places. Durban especially was always a favourite port as the Committee of Australian Residents there always made all Australians passing through feel quite at home, and as the personnel of the unit was originally entirely recruited from Sydney the great similarity between the two cities always seemed to appeal to those calling there.

It would be difficult (says Lieut.-Colonel Gray Nicholls) to describe adequately the hospitality and kindness shewn on every side by the residents of the town (Cape Town). Regardless of expense, time and trouble, all combined to make the stay (3 days) there memorable.

Her Excellency Viscountess Buxton spent an afternoon with the boys who were unable to join their more fortunate companions on shore. With each she left a box of chocolates and a bunch of violets after cheering them with a kindly word and a warm welcome to Cape Town.

Not the least generous of the gifts by the people of Durban and Cape Town to the Australian troops was the willingness with which a few indecorums and exuberances were forgiven and forgotten.

It might be imagined that medical problems of transportation chiefly occurred in the ships bringing damaged men from England to Australia, but, if the problems are measured by the number of deaths and the incidence of epidemics—the truth lies the other way. The *zymotic diseases*, measles, mumps, C.S.F., “influenza”, and so forth, that broke out during the voyages to England created, as has been seen, extraordinary medical problems for the A.I.F. depots in Great Britain in 1916-18 and even at the front. Those problems have been described;³ the present chapter throws light on some of the circumstances of their origin.

In all, 330,714 men or nurses of the A.I.F. embarked from Australia;⁴ 58,790 died overseas; 7,311 took their discharge overseas; 264,373 returned. The numbers carried on the outward voyage from Australia were thus considerably larger in the total than those carried on the inward voyage. Only two transports carrying shipments of Australians were torpedoed, one with a complement of reinforcements bound for England, the other with invalids. Both were attacked off the English coast and the troops were landed without loss of life.

³ Vol II, pp. 564-5

⁴ In addition to 3,011 members of the A.N. & M.E.F. for New Guinea and the Islands.

Mortality. Of the 5,444 members of the A.I.F. who died from disease or accidental injury outside Australia, 482 died at sea. The number of those who died of these causes on the sea transports, and the mortality rate of these per 1,000 per annum, are shown in the following table (*p.* 669), which contrasts the outward voyage with the inward.

The table on *page* 670 shows the causes of deaths that occurred in transports or hospital transports, *but not in hospital ships.*

Features of this record obviously calling for comment are.

1. The number of deaths on the outward as compared with the homeward voyage.
2. The heavier death rates in 1914-16 and 1918.
3. The extraordinarily small number of deaths on the homeward voyage of the invalid and troop transports.

These points will be dealt with in due course. Meanwhile the conditions, first, of the outward (Australia-England) and then of the inward (England-Australia) voyage will be considered.

THE VOYAGE TO ENGLAND

For the outward voyage, the transports were staffed for medical services by A.A.M.C. personnel *en route* for the seat of war, or by the "sea transport sections". These were raised in Australia, and were under the immediate control of the D.G.M.S. there. Their establishment varied somewhat but in 1918 they included the following: 1 medical officer, 7 nurses, 1 dispenser, 1 staff-sergeant masseur, 1 staff-sergeant quartermaster, 1 staff-sergeant general duties, 1 staff-sergeant nursing duties, 16 other ranks A.A.M.C.⁵ Ten of these units were raised, and worked during the war. They used to join the transport when it left Australia with troops, the medical officer in command of the section usually acting as "S.M.O." (Senior Medical Officer) of the transport. On arrival in Great Britain the various elements of the staff were held at Southall or some other advantageous centre and were thus often enabled to gain touch with some of the invalids who would be their care on the return voyage and to become acquainted with the improvised "supernumerary" staff who would co-operate with them for the trip.

⁵ From report by Lieut.-Col L. W. Jeffries.

DEATHS AT SEA FROM NON-BATTLE CASUALTIES IN THE A.I.F., 1914-1921*

Date.	OUTWARD BOUND.				INWARD BOUND (1915-1921).						OUTWARD AND INWARD.	
					Hospital Ships.			Transports			Grand Total.	
					Deaths.		Troops.	Deaths.		Troops.	Deaths.	
	Troops.	Nos.	o/oo p ann.		Nos.	o/oo p ann.		Nos.	o/oo p ann.		Nos.	o/oo p ann.
Oct. 1914- May 1916 ..	181,469	119	7.82		60	34.86	10,334	254,039	64	1.5	330,714	8.1
June-Dec. 1916 ..	86,242	123	8.58									
1917 ..	42,396	24	3.42									
Jan.-June 1918 ..	10,187	1	0.58									
July-Dec. 1918 ..	10,119	90	53.34									
1919 ..	201	1	29.82									
	330,714	358	8.1		60	34.86	10,334	254,039	64	1.5	595,087	5.59

*These figures are taken from (1) a return furnished for the Medical Historian by the Base Records Department. (2) A correction of this based on *individual files* and on *voyage reports* made by Mr. A. J. Withers. The rate per annum is obtained by supposing the average voyage to Egypt to occupy a month and to England, *via* the Cape, two months—a reasonable approximation to the time "exposed to risk". The period October 1914-May 1916 inclusive is taken because from June the transports went for the most part round the Cape—a voyage of 2 months instead of one.

Large numbers of British troops were also carried from India, but no figures for sickness or death among these were available. Strangely enough it has been found that the 60 deaths on hospital ships are not included in any table of deaths published by the Adjutant-General's Department (Base Records).

CAUSES OF DEATHS IN AUSTRALIAN TRANSPORTS 1914-21

Year.	Enteric.	Dysentery.	Influenza.	Pneumonia.	Pneumonia and Measles.	Pneumonia and C.S.M.	Measles.	C.S.M.	Rheumatic Fever.	Pleurisy and Empyema	Malaria.	Tuberculosis.	Syphilis.	Jaundice.	Appendicitis.	Heart Failure.	Nephritis.	Purpura	Sunstroke.	Cerebral haemorrhage.	Others.*	Total deaths.	Total Carried.	
<i>Outward</i>																								
1914 ...	1			10	3							1	1		1				1	1		1	18	33,037
1915 ...	2			29	3	1	2	12		1		1			1	4		1	5		2	2	66	97,438
1916 ...	1		1	54	9	1	6	60		1	1	7		1	4	3	1				3	5	158	139,592
1917 ...				6				12				1			1	2					1	1	24	42,396
1918 ...	1		64	21				2		1					1						1	1	91	18,829
1919 ...				1																		1	201	
1914-19:	5		65	121	15	2	8	86		3	1	10	1	1	7	9	1	1	6		6	10	358	331,493
<i>Inward</i>																								
1915 ...		1		1																		2	4	8,452
1916 ...				1				1		1		1			1		1					2	7	15,901
1917 ...				1				1				3			1	1						3	11	26,047
1918 ...			3	3						1		1			1							6	8	42,420
1919 ...		1		16				2				6			1	1						1	38	161,379
1920 ...																						1	1	10,054
1921-22																						—	114	
1915-21:		2	3	22				4		2		11			2	2	1				1	14	64	264,367†
GRAND TOTAL	5	2	68	143	15	2	8	90	—	5	1	21	1	1	9	11	2	1	6		7	24	422	596,860

* "Other diseases" (in the above table) include: 1 burns, 1 thermic fever, 1 blood poisoning, 3 toxæmia, 1 uræmia, 1 myalgia, 1 carbuncle, 1 diabetes, 1 diptheria, 1 paralysis of insane, 2 melancholia, 1 abscess liver, 1 injury, 1 hydatids, 1 epilepsy, 1 aneurysm, 1 smallpox, 1 pyæmia, and 3 syncope Deaths on the hospital ships are shown on p.p. 669, 666, 668

† Omitting 6 returned to Australia in 1914.

Of the sea transport sections the 1st, starting in the *Demosthenes* on 19th March 1916, made six round voyages between then and 1st January 1919; the 2nd, 3rd and 4th also made six voyages, the 5th and 6th five, and the 7th, 8th, 9th, and 10th (mental) between two and four voyages each.

It is much to be regretted that the very great Australian experience in sea transport in the war of 1914-18 was not made

**Epidemics
at sea**

the opportunity for an expert study of the development and course of "epidemics" of disease.⁶ The sea transport of troops presents many advantages for such a study. A troopship is a self-contained highly insulated and concentrated "herd". In Australian transports, and in no others to the same extent, this "herd" remained together on the voyage to or from England for eight weeks. The "herd" was reasonably homogeneous in its susceptible vicissitudes, but disciplined to a wide range of protective and prophylactic expedients and experiments, such as shore quarantine, prompt diagnosis and isolation, immunisation and treatment. Every new case was reported on pain of severe disciplinary action, a skilled staff, professional and clerical, was often available; and provision could easily have been made for the collecting, assembling, and manipulation of a large number of reasonably comparable experiences.

But the material for a full study is not available. Certain epidemic phenomena however are so outstanding as to require a note, however inadequate. They comprise (1) *pneumonia*, (2) *cerebro-spinal fever*, (3) *measles and mumps*, (4) "*influenza*"—the chief epidemic problems of the transports.⁷

Between May 1916, when the Cape route was adopted and December 1916, 86,242 troops were conveyed to England by that route with 123 deaths from disease during the average eight weeks' voyage, approximating .143 per cent. of the men transported or an annual rate per 1,000 per annum of 12.4. The causes of mortality were as follows:

⁶ As a proof of the immense value and importance of such a research the reader is referred to the "Service Publication No. 18" on *Influenza* by Dr. J. H. L. Cumpston, issued by the Australian Quarantine Service (1919).

⁷ Diphtheria and scarlet fever were not uncommon but did not initiate ship epidemics. Intestinal infections were almost unknown on the outward voyage, with one exception namely, occasional fulminating outbreaks of "ptomaine poisoning" due to mass infection of food "of unknown origin".

C.S.M.	51	Measles	1
C.S.M. and measles	1	Bronchitis	1
C.S.M. and pneumonia	1	Pneumonia	41
C.S.M. and T.B.	1	Pneumonia and enteric	1
T.B.	3	Pneumonia and measles	8
T.B. and appendicitis	1	Appendicitis	3
Endocarditis	1	Peritonitis	1
Haemorrhage	1	Malaria	1
Toxaemia	2	Jaundice	1
Heart failure	2	Uraemia	1

In 1917 the numbers embarked were less than a third of the total transported in the previous year, and for a time towards the close of the year the Cape route was only occasionally used. With the reduced numbers in camps in Australia infection was considerably lessened and in consequence was less on the transports, though never absent. Out of 42,396 transported overseas during 1917, 24 deaths occurred *en route* including 12 from C.S.M. and 6 from pneumonia. In 1918 the numbers embarked fell still further and with the diminished flow it was decided to fit only the upper decks of transports and thus allow of the complete use of refrigerated space and lower troop decks for freight. This involved a reduction in the troop-carrying capacity but permitted a proportionate increase in deck space per head. In 1918, during the first six months, 10,187 left Australia with only one death *en route*, and that from empyema.

Pneumonia. As shown in the analysis of deaths, this "disease" stood high as a cause of mortality in transport life. It is impossible to discriminate the cases of primary lobar (pneumococcal) pneumonia from those of secondary and broncho-pneumonias. Its association with measles and "influenza" is so involved as to make an exact appreciation of its epidemiological significance impossible. It can however be stated that, speaking broadly, its incidence was in direct ratio to the density of the ship's population, the presence of measles and "influenza", and though in a very minor degree, of cold and wet.

Cerebro-spinal fever. The many similarities between this "disease" and the foregoing—using this term "disease" to signify the pathogenic activities of the diplococci of Fraenkel and of Weichselbaum respectively—as seen in ship-board epidemics of respiratory diseases, has been commented upon.

It has already been stated that the Great War was the occa-

sion, if not a cause, of a world pandemic of cerebro-spinal fever with occasional epidemic out-flares. The Can-

History of C.S.F. in the sea transport adians in camps on Salisbury Plain suffered not less severely than the soldiers in camps in

Australia and for the same reason—conditions of life (wet and cold, ill-housing, crowding) that were in part unnecessary and should have been avoided, even in war. The epidemic in Australian camps in 1915 was the initial and inevitable source of troop-transport epidemics which during 1915-16 were a cause of grave anxiety and of a large proportion of the 422 deaths at sea.⁸

The oceanic phase of the pandemic, as seen in Australian experience, occurred in a large number of comparatively small communities—shiploads of troops—self-contained and insulated, within which minor outbreaks arose. The maximum number of cases on any transport was not more than six.⁹

The significance attached by peoples and even governments to any specified disease is determined much more by its killing proclivities than by its general incidence. Cerebro-spinal fever has never given proof of any great potentiality for epidemic diffusion—the contrary, indeed, is emphatically more true. It requires, as was found during the war, the development of a carrier rate of some 10 per cent. before actual “cases” of the disease appear, and it is accepted that the diffusion of immunity through a susceptible population is great.¹⁰ Gauged by the number of diagnosed cases the outbreaks of disease due to effective infection with the diplococcus of Weichselbaum was trifling.¹¹

⁸ See Vol. I, pp 25 and 528-9, and Vol II, Chap. xix. An exact study of this epidemic was made by Maj M. J. Holmes, of the Commonwealth Department of Quarantine but was not published. A complete account of the outbreak was published by Fairley and Stewart (*Service Publication No. 9* of the Commonwealth Quarantine Service, 1916). A study of the camp epidemic in Australia of 1940-41 which links the two outbreaks by Lieut.-Col. M. J. Holmes (Director of Hygiene Australian Military Forces) has been published in the *Medical Journal of Australia*, of 12 Apr. 1941.

⁹ It has unfortunately not been found possible to make a complete inventory of the transport experience.

¹⁰ The outbreak in Australian camps was associated with a large number of cases of febrile illness which Australian observers identified as C.S.F. *sine meningitis*.

¹¹ It is not a little remarkable that the occurrence of a few deaths from disease among the soldiers in training camps is a cause of far greater possible concern and resentment than that caused by a holocaust of deaths as “battle casualty”. The latter is regarded as an inevitable and expected “act of God”—the ruling “God of War”—of the former as a defect of man i.e. the medical service—which has a body to be kicked. It is not less worthy of note, that when war is supplanted by famine and universal disease—as in Russia after her debacle in 1917, the reverse is the case; deaths from violence are reprobated, deaths from disease accepted as an Act of “God”.

But it is safe to say that no "disease"—excepting perhaps pneumonic influenza—caused so great a public concern and official anxiety, due to the fact that a man who became a case of C.S.F. had about a "fifty-fifty" chance of dying. Possibly the recent discovery of a chemio-therapeutic treatment so efficacious as that by the sulphonamide group will reduce the disease from a military point of view to comparative unimportance.

Be this as it may, the occurrence of a few deaths from C.S.F. on the troop transports in 1915-17 was a cause of administrative concern out of all proportion to their direct military significance. Yet in military affairs, and perhaps in civil also, there is, apart from numerical strength or loss, a factor which it would be the height of folly to neglect. Even if the actual death rate is small on a voyage of six to ten weeks through the tropics the *morale* of troops may be adversely influenced by many conditions,¹² of which the occurrence of deaths is one. Moreover outbreaks of infectious disease, even of minor significance on the ship itself, may leave foci—cases and carriers—whose potentiality for dislocating military operations was impressively proved within the experience of the A.I.F.¹³

The records of steps taken to deal with this menace come chiefly from the terminal points of the voyages and the intermediate stops—namely from Australia, England, and either Suez or Cape Town. At Suez in 1915 a particularly efficient and enthusiastic officer, Captain Frederic Lovegrove, A.A.M.C., in reports that were of great service drew attention to the fact that the camp epidemics in Australia were exactly reflected in ship epidemics on the transports. With the increasing infective pressure within the camps at the end of 1915 and early 1916 the case incidence of the troopships increased; and with the change of route to the Cape in May the transport problem came to a head. It was first brought into prominence by representations from South Africa and by the civil, not the military, medical service in Australia.

In December of 1916 the Australian Government received

¹² A medical officer notes that, "The most unpleasant of the non-fighting experience of the infantry private was the voyage on a troop transport through the tropics round the Cape. The water-supply did not allow of fresh water to wash with, and soaping with salt water was impossible. Sweating was profuse, and sleeping at night in hammocks with the 'head' to 'foot' arrangement, which had been introduced to minimise infection, was often a cause of intense nausea."

¹³ See e.g. *Vol. I, Chap. v* and *Vol. II, Chap. xix*.

from the South African Government a minute regarding the arrival in South African ports of Australian transports with cases of cerebro-spinal meningitis. Dr. Alexander Mitchell, assistant Medical Officer of Health in Cape Town, pointed out that some ships arriving there presented clean bills of health though enquiry subsequently made elicited the information that actual cases of meningitis were on board. Owing to difficulties in enforcing restrictions the South African authorities had lifted quarantine restrictions on Australian and New Zealand transports there, relying solely on measures for prompt detection and isolation, systematic gargling of all troops on board, disinfection, and airing of quarters.

Surgeon-General Fetherston referred the matter to Lieut.-Colonel J. H. L. Cumpston, the Director of the Australian civil quarantine service, who was his adviser in these matters asking whether he knew of any practicable precautions. Dr. Cumpston on December 22nd suggested that exact particulars of cases should henceforth be obtained.

It will then be possible to assess the importance of what is on land the principal factor concerned in the spread of the disease, *viz.*—overcrowding. If it can be shown that this is likely to be an important point, steps could, and should, be taken to reduce the number of men sent on each transport.

Dr. Cumpston further suggested that all troops on any transport where the disease was suspected should be vaccinated with meningococcal vaccine and a daily throat toilet should also be carried out on such ships. The New Zealand Government eventually fitted its transports with "inhaling chambers" and all troops with sore throats or suspicious symptoms of cold or influenza were treated with antiseptic sprays. In February Dr. Cumpston, having heard from Dr. Mitchell that the transport *Suevic* was "overcrowded" and had meningitis on board, wrote again to Surgeon-General Fetherston:

This information is transmitted to you, as it is thought you might like to be aware of the situation. It would appear that improvements are possible in the direction of reducing considerably the number of men sent away on transports, as previous experience in this respect indicates that such a measure would undoubtedly be followed by a marked diminution in the number of cases of meningitis among the soldiers.

Dr. Mitchell noted in April 1917 that, doubtless owing to

the New Zealand precautions and the similar steps being taken by Australia the cases had greatly declined. Only four Australian transports had arrived infected since January 1st—the worst of these, the *Ayrshire*, had 2 deaths at sea, 3 cases landed at Durban, and 4 carriers discovered and landed at Cape Town.

Meanwhile the troops from the transports had apparently carried infection into their camps in England. As has been already mentioned, Dr. C. J. Martin,¹⁴ was recalled from his work with the Light Horse in Palestine and asked to advise especially as to carriers of this disease discovered in Australian Administrative Headquarters in London. He reported to General Howse as follows:

1. Incidence of Cerebro-spinal Fever upon our troops in camps in England and during the voyage from Australia.

Between the dates 30.6.16 and 2.12.16, 50 transports arrived in England from Australia carrying in all 38,500 troops. The number of troops carried on individual boats ranged from 42 (s.s. *Pera*) to 2,675 (s.s. *Ceramic*). 44 cases of Cerebro-spinal Fever occurred during the voyages. On 32 ships, no cases occurred. On the remaining 18 ships, the number of cases varied from 1 to 8.

The number of cases on these ships was not proportional to the number of troops carried, the highest number (8) having occurred on the s.s. *Persic* which carried only 113 troops, and the next highest number on s.s. *Runic* carrying but 134. From a perusal of the M.O's reports, there seems in several instances to have been no provision on board for the proper treatment of the cases or disinfection of the contacts. Much energy seems to have been dissipated in the disinfection of the ships, one ship being detained at Durban for a fortnight for this purpose, an expensive and unavailing procedure.

It has been established that healthy persons may harbour virulent meningococci in their throats for considerable periods without themselves suffering from the disease, and it may be safely assumed that some troops were landed in an infective condition. That this assumption is probably correct is indicated by the fact that in the six months, June to December, 1916, 33 cases of Cerebro-spinal Fever have occurred in the A.I.F. training depots on Salisbury Plain. This is more than three times the number which occurred in the same months last year amongst other troops in these camps. As the principal epidemic period in Southern England is January, February and March, the matter demands watchfulness.

2. Measures in force for the prevention of Cerebro-spinal Fever in A.I.F. Camps and for dealing with cases as they occur.

The responsibility for the diagnosis, isolation and treatment of cases of Cerebro-spinal Fever and the prevention of the spread of the disease devolves upon the Medical Service of the Command in which Australian troops happen to be.

¹⁴ See Chap. v.

A.I.F. Training Depot, Tidworth.

At Tidworth, there is a bacteriological laboratory for Cerebro-spinal work. It is in charge of a R.A.M.C. officer specially trained in this department of bacteriological work and experienced in the diagnosis and treatment of the disease. Should a suspicious case arise, the M.O. summons the bacteriologist who forthwith proceeds to investigate and advise on the diagnosis and treatment of the case, segregation of contacts, etc.

The Laboratory is adequately equipped and the officer in charge and his assistants appeared to me to be efficient. Should, however, an epidemic of even moderate dimensions occur, the staff would not be able, owing to the scattered nature of the camps, to cope with it in the manner laid down in the memorandum.

I am informed by Col. Reece, A.M.S., the officer responsible to the D.G., A.M.S., for all arrangements concerning Cerebro-spinal Fever amongst troops in England and Wales, that in such a contingency he has a special officer and mobile laboratory which can be despatched to any locality where there is pressure of work. Col. Reece expressed confidence in his ability to deal with any situation likely to arise, but, as epidemics may not unlikely occur amongst troops in several localities simultaneously, the margin of safety seems to me slender. However, your suggestion to establish a central laboratory for the A.I.F. in London, which suggestion is being carried out, will permit of the A.I.F. supplementing the British Agency if need be.

Weymouth and Wareham Command Depots.

An excellent Military laboratory exists at Weymouth. The officer in charge and his assistants are completely competent. The number of Australian troops in these camps is small and the agency quite adequate to deal satisfactorily with any cases which arise.

3. The prevalence of Meningococci in the throats of troops at the A.I.F. H.Q. Horseferry Road.

A few weeks ago a case of illness occurred amongst the staff, which was suspected to be Cerebro-spinal Fever. Subsequent events showed that the suspicion was unfounded. Capt. Flack, R.A.M.C., the special officer of the London Command, was called in and pending a diagnosis being made, the throats of the staff who had been in close contact with the patient, were swabbed and cultures made therefrom. The results showed that a considerable number of these persons were harbouring undoubted meningococci. This discovery seemed so important that Capt. Flack, with commendable energy, extended his observations to 500 of the H.Q. staff and the examination disclosed the disquieting fact that 16 per cent. were carrying meningococci identical with spinal strains in their throats. What the significance of this finding may be, I am not certain. It is susceptible of two interpretations. Either the existence of so many carriers among a population living indoors in crowded quarters is a serious menace or the proportion of carriers amongst non-contacts at this time of year is normally much higher than has been hitherto suspected. The complete understanding of the pathology and epidemiology of Cerebro-spinal Fever is still far from complete. It is uncertain whether the majority of these meningococci, which are in every way indistinguishable from spinal strains, found in the throats of healthy people, are virulent and capable of effecting an entry into the body, or whether the small proportion of cases to carriers is occasioned by the small chance of the

meningococci finding their way to the brain along the connections between the lymphatics of the upper nasal passages and the sub-arachnoid space. Probably both these factors are concerned, and carriers who have had a case of the disease among them are more dangerous than those who have not.

The gravity of the conclusion to be drawn from the situation disclosed at H.Q. must be determined according to whether 16 per cent. of carriers is or is not greatly in excess of the proportion in the general population which has not been in contact with Cerebro-spinal Fever. Observations bearing on this point were made upon 136 persons attending for all sorts of causes the out-patients department of the Lambeth Infirmary by Dr. W. M. Scott working under Dr. Eastwood, Bacteriologist to the Local Government Board (Reports L.G.B. on Public Health and Medicine Subjects, New Series 110, 1916). These observations were made in June and July, 1915, that is during a non-epidemic period. Dr. Scott found meningococci which he could not distinguish by any of the means at our disposal from spinal strains in 13·7 per cent. of these persons. Further, Dr. Eastwood informs me that three of his staff are at present engaged in an extension of this enquiry to a London population, to the inhabitants of a large engineering workshop at Cambridge, and to troops at Chatham. He was kind enough to show me the results of these enquiries up to the present time. So far, they are in accord with those obtained by Dr. Scott last year. In no case had any of the persons examined, as far as could be ascertained, been in contact with cases of Cerebro-spinal Fever.

4 Precautions against Cerebro-spinal Fever recommended to be taken on embarkation of troops in Australia and during the voyage of transport.

I assume that a bacteriological examination of the throats of all contacts with a case of Cerebro-spinal Fever is the universal practice in Australian depots and that contacts are not permitted to rejoin their comrades until the result of such examinations is consistently negative.

A subsequent routine bacteriological examination prior to embarkation, and the elimination of those harbouring meningococci, would be the ideal procedure, but would, I fear, involve more skilled attention than is available and also would be likely, judging from recent experience in this country, to lead to the retention of a larger proportion of the drafts than the military situation justifies. Failing such a sifting process, it must be assumed that infective persons will continue to be carried upon transports. The close quarters which are a necessary condition of military transports are highly favourable to the spread of any infection and particularly of such a one as that of Cerebro-spinal Fever, which passes from the upper respiratory passage of one individual to another. Medical officers should therefore be prepared to promptly diagnose cases if they arise and to deal with the situation in accordance with knowledge.

I have attached hereto (i) a memorandum to M O's Transports, (ii) a list of materials and equipment to be carried by every ship which I have drawn up according to your instructions. I trust the memorandum proves useful. As ordered, I am having 1,000 copies printed for transmission to Australia.

New Zealand had already received similar advice from a

great British authority, Lieut.-Colonel W. W. O. Beveridge, A.D.M.S. for Sanitation, B.E.F., who wrote:

On our advice the New Zealand transports have been fitted with steam sprays and the New Zealanders have gone a step further and installed sprays at some of their ports of departure. They have had cerebro-spinal fever, mumps, measles, and influenza and other diseases, the infection of which is apparently contracted through the nasal mucous membrane, in their camps on the other side and they have put their troops through a prophylactic course of spraying before sending them on board ship. The result has been rather extraordinary up to date. The New Zealand transports arrived with practically no sickness of the sort mentioned above on board, whereas the Australians, who have not yet installed these sprays, come over sometimes with very considerable sickness on board.¹⁵

The recommendation from the naval authorities in Australia was that all troops should be examined prior to embarkation.

The question then which we have to answer resolves itself as follows: which, if any, of the four policies advised by these several authorities was effective in causing the very dramatic cessation of the outbreaks? In effect it lies between those still unpredictable natural forces which create the "epidemic curve" and rational action on the lines indicated. It is not proposed to attempt an examination of the first of these. *Prima facie* it seems likely that measures taken did in fact influence in some degree at least the course of events, and it is possible in some degree to evaluate these.

With disease of the "infective" type, in the mass, as in the individual, credit for the suppression of an outbreak as for cure of the patient is often claimed for therapeutic action which most immediately antecedes amelioration. The fallacy of this procedure is proverbial, and no attempt here is made to establish such relations. In this instance moreover it is possible to identify a consensus of opinions as to the supreme importance of an aetiological factor which has this special interest for Australian history that from the departure of the "first convoy" in 1914 and throughout the war it was discerned by Australian medical authority as fundamental.¹⁶ This may be stated as faucial contiguity, and corresponding atmospheric density of the *contagium vivum*. A diagram in *Volume II* (page 557) illustrates a note

¹⁵ From "Some Notes on Anterior Poliomyelitis and Cerebro-spinal Meningitis", dated March 1917.

¹⁶ See *Vol. I*, p. 35n

by Colonel W. W. O. Beveridge, R.A.M.C., *at the end of 1918*, on the efficacy of "spacing out" beds in huts for preventing pneumonia, cerebro-spinal and scarlet fever. The question of air-space on transports carrying Australian troops and invalids has been prominent in all the relevant chapters of this history. The great falling off of recruiting in the last half of 1916 and in 1917 made it possible to give effect to Lieut.-Colonel Cumpston's advice. None of the other procedures were carried out in a manner which would suggest that they materially influenced the situation. There is, indeed, no reason to doubt that both in Australian camp and transport experience "spacing out" was the most important factor in the control of all bacterial diseases of this type.

Whether the problem might be tackled from the other aspect—by increasing the individual's resistance by specific medication, biological or bio-chemical—is a matter which lies outside the scope of Australian experience in 1914-18.

Measles and Mumps. From the first convoy in October, 1914 till the last sailings at the end of 1918, fluctuations in these diseases on board the Australian transports seem to have reflected generally the epidemic tension in the camps of training. The course of ship epidemics varied greatly. On some ships an epidemic would reach its climax within a few weeks—in others not till near the end of the voyage. Observation of Australian records suggests that the amount of contact (taking into account both the *duration* of contact and its *intimacy*) was the chief determining factor in the spread of ship epidemics through comparable ship communities: and that a space-time buffer zone, at both ends, between the *transport* and the camps, was for military reasons well worth while.

Measles. In his work on *Epidemics and Crowd Diseases* Major Greenwood stresses in the case of measles, its "very short infective period" and "its remarkably constant periodicity". After stating that varying states of immunity largely determine the course of epidemics, he continues: "From the immediate practical point of view, it is impossible to doubt that a postponement of the age of attack is what public health action should seek to secure, combined with amelioration of those particular conditions of over-crowding which are especially helpful to the efficiency of droplet infection."

In the history of the A.I.F. measles, either alone or more often complicated by pneumonia, was responsible for a large proportion of deaths at sea from "disease". In camps and transports over the whole period of the war it was little if any less deadly than cerebro-spinal fever. It occurred in most outward transport voyages. The course of measles epidemics on the transports varied considerably. The most important modifying influences appear to have been (1) the early discovery and prompt isolation of the first case; (2) the facilities for isolating "contacts" and subsequent cases, and the vigour with which this was carried out. The peak of the epidemic was usually reached in about the 4th or 5th week of the voyage, though energetic action by the S.M.O. sometimes deferred it to the end of the voyage.

Accepting with Greenwood the hypothesis of a high infectivity and short striking-time, the explanation of the remarkable prevalence of measles in the Australian forces would seem to be in (1) the success with which all disease is controlled in childhood in Australia, and the consequent presence in any adult Australian "crowd" of a large number of susceptibles; (2) the tendency of the virus, given the opportunity of constant intimacy of contact in a susceptible population, to embark on a local career of epidemicity; (3) the fact that this requirement was fulfilled in training camps and transports notwithstanding the special Australian precautions. In the case of this disease it is especially regrettable that the absence of exact records of the morbidity on Australian troopship voyages makes an exact study of the 1914-18 experience impossible.

Mumps. The epidemics of mumps often reached their peak at the end of the voyage to England (7-8 weeks), and this disease was a serious military difficulty in the Depots in U.K. and in France until effective steps were taken to stamp it out.¹⁷

Non-specific "influenza" and sundry coryzas. As in camps, these "diseases" were ubiquitous causes of minor and not-so-minor ship epidemics. The ship-board epidemics had an ill-defined but observed relation to the camp experience of the troops—the more highly infected the camp, the greater the ship-board incidence.

¹⁷ See Vol. II, pp. 556, 564.

The history of "influenza" in the experience of the Australian Imperial Force seems, as was suggested in *Volume I*,¹⁸ to point to a biological relationship within the special groups of viruses which have now been identified as the "cause" of "influenza". In the Australian transports medical officers of approved clinical ability identified many minor outbreaks as symptomatically and epidemiologically "influenzal"; they also noted in the specific and violent "pneumonic" influenza certain clinical and epidemiological features that seemed to give it authentic relationship with feebler representatives of the popularly designated "influenzal" group. However true this may prove to be the observations may be cited as an example of the relation that should exist between "clinical science" and laboratory research.

Pneumonic influenza. It is a curious fact that the main outbreak of pneumonic influenza in Australian transports occurred, not on the voyage from England, where the disease was raging, to Australia, where it was not, but on the outward journey from Australia to England and India. The reason for this was that towards the end of 1918 a number of ships from Australia to England and India called at South Africa where the epidemic was severe. From some ships the troops were allowed to go ashore, from others they were not. The men who went ashore became infected and pneumonic influenza spread among their shipmates. The whole occurrence, however, relates so closely to *quarantine* that the detailed discussion of the incident must be deferred until that subject is dealt with in the next chapter. Here it will suffice to note that the experience of this epidemic in the Australian transports tends to discount the theory now current in "highbrow" medical circles that the extrinsic agent in epidemics is comparatively unimportant.

With other experiences of the war it would seem to show that, apart from the specific immunity conferred by the disease or by artificial means, the "resistance" of the subject should not be unduly stressed. Even if we restrict the term "epidemic" to those communal outbreaks in which the agent is living¹⁹ and further-

¹⁸ *Chap. v*

¹⁹ An "epidemic" of scurvy—such as before the scientific era used to be almost as constant a feature of warfare as epidemics of typhus and dysentery—is obviously a phenomenon which differs fundamentally from an "epidemic" of (say) virus-caused influenza. It is for example capable of exact and certain control—by actual

more to those in which this extrinsic factor is the most imponderable (*e.g.* those caused by virus), the importance of specificity in the extrinsic cause received in the war definite and even dramatic confirmation.

THE VOYAGE TO AUSTRALIA—I. HOSPITAL SHIPS

The obverse of the problems of Expedition—those of Repatriation—must now be described.

In this business of repatriating the Australian invalid, three problems were dominant; that of the available supply of transport, and its nature; that concerning the special needs of the invalids; and that of the personnel to take care of them.

The first six months of 1916 was still occupied largely with the somewhat leisurely clearance of the large accumulation of Australian invalids in Egypt from Suez by the
The means of transport Hospital Ships *Karoola* and *Kanowna*, or selected transports. Invalids from England were at that stage sent by British hospital ships to Egypt, and thence by train to the Australian hospital ships at Suez. Somewhat later they were sent direct in hospital transports ("black ships") *viâ* the Cape.

But with the Somme battle came a surge of B2 and C class convalescents and cripples, a rigid enforcement of the six months' policy, and a more intensive submarine campaign. From that time onward the struggle to secure transports for repatriating invalids became even keener than that for ships to bring reinforcements from Australia.

The two outstanding conditions in the problem were, first, the fierceness of the German submarine campaign, and, second, the fact that Australia had thought it necessary to equip only two small hospital ships, the *Karoola* and *Kanowna*.²⁰ These had been provided for a force of only two divisions, and a four

weighing and measuring—of the disease agent: so many units by weight of vitamin C for 1,000 men will *automatically* and *absolutely* stop the spread of scurvy. The statistical principles which govern an "epidemic" outbreak of ergotism must differ *in toto* from those which apply in an epidemic (say) of measles. Again, though it may have many features in common with epidemics of infectious disease, an "epidemic" of crowd-hysteria—using the term in the sense applied by Babinski, *i.e.* a pathogenically heightened suggestibility—such as the "dancing mania" of the Middle Ages, or of "shell-shock" must present again a different set of epidemic factors.

²⁰ Early in 1915 two Australian transports, the *Wandilla* and the *Warilda* were transferred to the British Admiralty and used by the War Office as hospital ships in the Channel service. All these four were Australian coastal liners of about 7,000-8,000 tons.

weeks' voyage from Suez. Their combined capacity would suffice to transport *in a year* only some 3,500 patients, each ship making between three and four voyages. In October General Howse recommended that a third hospital ship be provided and Colonel Downes (then A.D.M.S. in Egypt) asked for another to ply from Suez. In this he was supported by the D.G.M.S., A.M.F. (General Fetherston), who on 22nd November 1916 wrote to Howse:

Apart from the difficulty of accommodation on black transports, there is a danger of so sending men. That was the reason for sending our cable to you. If anything happened to one of the hospital transports which had on board men who were crippled and they were lost or drowned, we would never hear the end of it. Therefore I have raised the question of invalided troops not being returned on any but "white ships" and I certainly intend to push it. I do not mind so much men who are able to walk about and look after themselves. I have already asked tentatively pending reply for two extra hospital ships. If they are granted and arranged for here, I won't have any but big ocean liners, not as at present, intercolonial liners. With 4 ships and the assistance of New Zealand we ought to be able to carry 5,000 a year, perhaps 6,000. It would relieve you of your very worst patients.

Howse replied on 11th January 1917:

Very glad to see your action re hospital ships. I am in dread every time a transport goes away with invalids, particularly when it carries upper and lower berths, and I certainly think that I should be immediately recalled. Am very strongly with you that no case not able to look after himself, in case of accident, should be sent except by hospital ship. Four hospital ships will absolutely meet the case.

But in the last months of 1916—another unforgivable breach of the law of nations—two hospital ships were torpedoed in the English Channel and the whole problem of invalid transport was for a time in confusion. The project of additional hospital ships was dropped, both because it was difficult to get suitable ships for the purpose, and through doubts as to the security afforded. Though a partial understanding was soon after reached with the Germans on this matter of protection,²¹ from this time the

²¹ A statement on "Sea Transport of the A.I.F." by Mr Greville Tregarthen, Commonwealth Naval Transport Branch, says: "The Imperial Government notified the enemy that cross channel ships would no longer claim protection under the Geneva Convention. Distinctive colouring was painted out, including the Red Cross Ships were armed and escorted . . ."

Hospital ships in other waters were also escorted in future, which led to delays *en route* in the case of the *Karoola* and *Kanowna*

The loss of hospital ships (see below) in 1917 was so grave that a request for

implementing of the Australian "six months' policy" was based chiefly on the system of "black ships".

Such further relevant facts and comment on the Australian policy in this matter of sea transport as seem necessary are conveniently given here. The total number of "invalids" returned to Australia from England and Egypt in the *Karoola* and *Kanowna* was, as we have seen, 10,334; the balance, some 93,000, travelled in "invalid carriers"²²—black ships. These were for the most part ships of up to 15,000 tons register.²³ They were fitted up to take invalids to Australia during most of the war round the Cape, returning with troops or cargo from there or elsewhere in the East, which hospital ships could not do. It would have required 12-13 hospital ships of the capacity of the *Karoola*²⁴ to repatriate all the men invalided to Australia during the war; and from the strictly medical point of view, the majority of invalids would travel as well by black ships, most of which were much finer vessels than the *Karoola* and *Kanowna*. It is true that in the "black" ships the patients lacked such protection as might be accorded under the Geneva Convention to men carried on "white" hospital ships, and that even on the Cape route they had to pass for some days through submarine-infested waters. The risk run was material—certainly much greater than if the invalids were carried by hospital ship. The

temporary loan of the *Kanowna* or *Karoola*, when next in the United Kingdom was anticipated by the Commonwealth Navy Department

At a later period official guarantees were received from the German Government to the effect that hospital ships, if distinctly marked, would not be attacked elsewhere than in the Mediterranean; their safety could be guaranteed by means of the presence of neutral "Commissioners" on board. As to cross channel hospital ship traffic, no agreement was arrived at.

The sixteen hospital ships sunk by the Germans were.

1915—7 Nov., *Anglia*.

1916—28 Oct., *Galeka*, 21 Nov., *Britannic*, 23 Nov., *Braemar Castle*.

1917—1 Mar., *Glenart Castle*; 21 Mar., *Asturias*, 30 Mar., *Gloucester Castle*;
10 Apr., *Salta*; 17 Apr., *Lanfranc* and *Donegal*, 26 May, *Dover Castle*;
10 Oct., *Goorkha*

1918—4 Jan., *Rewa*; 10 Mar., *Guildford Castle*; 27 Mar., *Llandoverly Castle*;
3 Aug., *Warilda*.

²² See Vol. I, p. 222 and p. 829 (Glossary). The naval "hospital carrier" does not appear to have been used except in the Gallipoli Campaign.

²³ Among those chiefly used were the *Themistocles* (11,231 tons), *Ulysses* (14,499 tons), and *Suevic* (12,531 tons) which made 6 voyages each, before the end of 1918, and *Runic* (12,490 tons), *Borda* (11,136 tons), and *Euripedes* (15,050 tons), 5 voyages each.

²⁴ The official capacity of the *Karoola* when fitted up as a hospital ship in 1915 was as follows: Officers—44 cot, warrant officers—6 cot, other ranks—cot 231, non-cot 182 (in double-tier berths), Total—463. She actually carried at times up to 470 and appears to have averaged 466 on her 13 trips to Australia.

precautions taken however were very exact and effective;²⁵ and the justification for the policy adopted lies in the fact that not one invalid, *en route* to Australia, was lost through enemy action.²⁶

In the first six months of 1916 some 7,500 invalids, officers, nurses, and other ranks, went to Australia by the various means and routes noted above and in the second half

The scope of the problem 6,147. During 1917 the number of invalids requiring repatriation increased almost in geometric progression, and with it the difficulty of obtaining transport. In the eighteen months ending 31st December 1917, 1,326 invalid officers, 273 nurses, and 29,961 other ranks had been sent off by the Cape route, in nine voyages by hospital ship, and thirty-seven by "ambulance transports"—as the black ships were then being called; and 6,500 invalids were in England awaiting return. In the first quarter of 1918 invalids were often conveyed in the faster type of ship to Cape Town, and there transhipped to slower vessels for Australia. From April 1918 the Panama route also was used; others went by "convoy" to America and thence by train to Vancouver in Canada for reshipment to Australia. Yet another route *viâ* Marseilles or direct by British hospital ships, to Egypt, and thence to Australia by Australian hospital ship, or ambulance transport.

In all during 1918, up to the Armistice, 1,454 officers, 186 nurses and 29,489 other ranks were repatriated; and, during the war and up to the final demobilisation of the A.I.F., 103,897 members of the A.I.F. were returned to Australia as "invalids": 71,048 sick or injured, 31,375 from wounds, and (in 1915) 1,474 cases of V.D.

Thus the decision made in 1915 by the Australian Department of Defence and Naval Board not to form a fleet of hospital ships, but to rely upon two only, together with "better-class troopships fitted up",²⁷ had far-reaching repercussion in 1916. It involved an increasing struggle for sea transport, which, in

²⁵ From the middle of 1917 they were sent in convoys, commonly of five vessels, and escorted through the danger zone by one or more destroyers

²⁶ On 15 July 1918, while acting as hospital transport for 835 Australians, mostly invalids, the troopship *Barunga* was sunk by submarine in British waters, but she remained afloat for some six hours and, owing to the efficiency and courage of the master and ship's company, and coolness of the troops, no lives were lost, though many of the patients had to be embarked on rafts. The discipline and general coolness in the face of danger were highly commended

²⁷ See *Vol. I*, p. 262.

turn, made necessary constant co-operation in England between the A.I.F. Headquarters (especially its medical branch) and the High Commissioner's Transport Branch and the Admiralty. The object of these efforts was to ensure two results, (1) that the supply of shipping should be adequate, suitable, and fitted up to fulfil the exacting Australian standard; and, on the other hand, (2) that the assembling and embarkation of invalids should "go like clock-work".

The policy of the A.I.F. and the Admiralty was in some matters in direct conflict. The implement of liaison between the two was the Australian naval representative at Australia House, Commander C. A. Parker, R.A.N. On one side of this most efficient officer stood the A.I.F., with its incessant urgent demands for shipping to clear the Australian Auxiliary Hospitals and Command Depots, and, on top of this, with an insistence on standards of space and convenience unknown before in the history of sea transport of invalids; on the other side stood the British Admiralty, with its thousand problems and difficulties; demands from east and west for transport; of troops to and from Egypt, India, Salonica, France; of invalids from each seat of war; of foodstuffs, munitions, raw materials, for all the Allies; and throughout, and overshadowing all, the sinister spectre of excess of U-boat sinkings over new tonnage. The moment when the irreducible minimum should be reached loomed constantly nearer and darker till the time came when only months intervened²⁸ between the Allies and possible defeat by the food

²⁸ The following, taken from *The Victory at Sea* by Rear-Admiral W. S. Sims, U.S. Navy (pp 2-4), is curiously apposite to this present war:

"Whenever I think of the naval situation as it existed in April, 1917, I always have before my mind two contrasting pictures—one that of the British public, as represented in their press and in their social gatherings in London, and the other that of British officialdom, as represented in my confidential meetings with British statesmen and British naval officers. For the larger part the English newspapers were publishing optimistic statements about the German submarine campaign. In these they generally scouted the idea that this new form of piracy really threatened in any way the safety of the British Empire. . . .

"This same atmosphere of cheerful ignorance I found everywhere in London society. The fear of German submarines was not disturbing the London season, which had now reached its height; the theatres were packed every night; everywhere, indeed, the men and women of the upper classes were apparently giving little thought to any danger that might be hanging over their country. . . .

"Yet a few days spent in London clearly showed that all this confidence in the defeat of the Germans rested upon a misapprehension. The Germans, it now appeared, were not losing the war—they were winning it. The British Admiralty now placed before the American representative facts and figures which it had not

blockade of Britain. Yet in these difficult circumstances there was built up a peculiarly effective system for the return of invalids to Australia. As Commander Parker himself said to the Australian Medical Collator, "All was chance, and yet nothing could be left to chance".²⁹

The length of the voyage made it necessary that as a rule the vessels used for the purpose should not return in ballast. In many instances, therefore, transports had to be fitted up afresh and re-staffed for each voyage. Moreover ships of the most varied, and often unsuitable, type were offered, not infrequently with the proviso—"this, or nothing!" As the seriously sick or wounded were too many to be accommodated in the hospital ships provision had to be made in the "black ships" for a proportion of "cot" (as distinct from "hammock") cases. They were placed in "double tier berths" or else in the ship's hospital. Moreover the staff placed in these vessels had to be adequate to the needs of the patients carried. The foremost questions, however, were those of *air and deck space, and ventilation, in relation to the number of invalids carried*. Here Australian policy was naturally in acute conflict with Admiralty procedure; its demands were far more exacting than those provided for in the current Admiralty specifications.³⁰

In this policy, however, General Howse was adamant; he insisted, indeed, on an individual survey of each vessel by his own staff officer, the A.D.M.S.3. Acting in direct association with the Australian naval representative, the Admiralty, and the contractors, this officer maintained for the D.M.S. a close con-

given to the British press. These documents disclosed the astounding fact that, unless the appalling destruction of merchant tonnage which was then taking place could be materially checked, the unconditional surrender of the British Empire would inevitably take place within a few months."

²⁹ In view of these facts the reader may more readily understand the uncompromising attitude of Surg.-Gen. Howse on the matters of the six months' policy and of "unfit recruits", as recorded in *Vol. II*.

³⁰ The following is taken from the *British Annual Report on the Health of the Army*, 1921.

In 1920 Admiralty procedure in the matter of the sea transport of troops was amended. (The new regulations followed closely the lines initiated by Australia.)

1. The interval between hammocks was increased from 16 inches to 27 inches.
2. Save in emergency, the number of men embarked in any one ship is not allowed to exceed the number for whom hammocks are available by more than 25 per cent (Previously, it will be recalled, the number of men embarked was based on the number for whom messing could be arranged on the ship.)

3. Special provisions must be complied with by transports trooping east of Suez during the hot season.

4. A special inspection is made of all transports.

trol of both the general requirements and the particular needs of the Australian system of invalid repatriation. Howse's policy was that: (1) *No vessel reasonably suitable, offered by the Admiralty should be refused*, with the accepted consequence that invalid boat rolls must be selected to suit the ships offered, and not *vice versa*; but that (2) *The accommodation of each vessel should be determined by actual survey* carried out by the Australian authorities, and based on *available* space as determined by ventilation, accessibility, and so forth, and not on the cubic and deck space as shown by the ship's plan and specifications.

As stated by Lieut.-Colonel Jeffries,

No definite amount of cubic space per man is followed. . . . The actual allotment of the number of men to embark on each troop-deck depends on the ventilation rather than on the cubic space of the deck.

And, as a final precaution

80 per cent. only of the total number of men for which a ship is fitted are finally embarked on upper decks and 70 per cent. in lower decks.

This was in effect an "insurance", effected by Australia in this war in the interest of her repatriated invalids. It might not always be possible.

Working on these commonsense "give and take" lines, and with the co-operation of a staff trained and inspired to his own broad outlook, Surgeon-General Howse achieved a success in this important domain of Empire co-operation that brought credit to Australia. In 1920 the Admiralty amended its own regulations largely along the Australian lines.³¹

Invalids included four distinct clinical types. The medical needs of these varied very greatly. This affected the provision not only of transport but of other necessities.

**Types of
patient**

These groups comprised:

(1) "*Cot cases*"—men who must have medical and nursing attention equivalent to that available in a well-conditioned hospital. (2) Fewer in number than those, but presenting requirements little less exacting—men whose condition called for segregation; because they were suffering either from *contagious disease*, in particular, from pulmonary tuberculosis with bacilli in the sputum, trachoma, dysentery, or venereal, or

³¹ The actual procedure of transforming a merchant vessel into an "invalid carrier" was laid down in British Admiralty regulations for "troop transports". The naval term "hospital carrier" was sometimes applied to these fitted transports but, it would seem, improperly. (See Vol. I, p. 222.) They were also known as "ambulance transports" and "hospital transports".

from the graver forms of *mental disease*, with disordered behaviour. (3) Those men whose return to Australia was due to the six months' policy, and *who did not require skilled nursing or hospital care*, but whose condition of health, or stage of recovery, called for some form of interim treatment—for the most part surgical—with intent to maintain unimpaired such degree of recovery as had been achieved, and to promote final treatment in Australia. (4) *Men whose medical and general requirements differed little from those of ordinary troops.*

"Cot cases" and patients who required special nursing and medical treatment travelled to Australia in the *Australian hospital ships*, or else in "better class transports".

**"Cot cases":
the "hospital
ship"** appropriately fitted up, and staffed by the "sea transport sections". The remaining "invalids" travelled, either by "better class" transports staffed by the "sea transport sections", or by such cargo ships as could be made available by the Admiralty, often at brief notice. The staff for these was improvised with members of the medical service who themselves had been marked for return to Australia, or else with "B" class combatants trained for the task in the manner presently to be described.

The hospital ships formed part of the Australian Commonwealth Mercantile Marine and, from the medical point of view, were administered by the D.G.M.S. in Australia.³² The *Karoola* (7,391 tons) was well adapted for her purpose, and though smaller than most of the better class British hospital ships, compared not unfavourably with these in convenience for working, and adequacy of fitting. The *Kanowna* (6,942 tons), in spite of much ingenuity expended by her Senior Medical Officer³³ in improv-

³² Their selection and fitting up has been described in *Vol. I*, and that of the *Grantala* (naval hospital ship) in the present volume. The *Grantala's* staff consisted of medical and nursing personnel drawn from the metropolitan hospitals and St. John's Ambulance Brigades in New South Wales, with Fleet Surgeon (later Surgeon Commander) W. N. Horsfall as P.M.O. In December, 1914, the *ss Kyarra* (6,953 tons) was painted and notified as a hospital ship and, though not fitted up as such, was used—as recorded in *Volume I*—to transport five hospital units from Australia to Egypt. In March, 1915, she was re-converted and took "unfits" and disciplinary cases back to Australia. In July and August, 1916, the *Warilda* (7,713 tons) and *Wandilla* (7,785 tons) which had been taken over by the Commonwealth as "troop transports", were lent to the British Admiralty for use as hospital ships, and though remaining on hire to the Commonwealth Government, were exclusively employed by the British Admiralty and entirely staffed by British personnel. Both ships had very extensive experience as hospital ships—which in some quarters has been wrongly attributed to the credit of the Australian Commonwealth. The *Kyarra* was sunk in the English Channel, on 26 May 1918, and the *Warilda* in the same area on 3 August. The *Kyarra* was not at the time a hospital ship.

³³ The Senior Medical Officers of the two hospital ships were: *Karoola*—Lieut.-Col. Gordon Craig, Lieut.-Col. T. G. Wilson, Lieut.-Col. A. M. McIntosh and Lieut.-Col. Gray Nicholls; *Kanowna*—Lieut.-Col. A. B. Brockway, Lieut.-Col. A. J. MacKenzie.

ing her facilities, was at the best a make-shift, and inconvenient to work. That the structural disadvantages were offset by the high quality of the service rendered by all members of the staff is, however, proved by the fact that in no respect did her results fall behind those of her sister ship.

In the course of their several commissions extending over five years the two Australian hospital ships traversed in all over 250,000 miles of ocean, and carried 17,760 troops, the greater part sick or wounded Australian soldiers, of whom 10,334 were repatriated by them. The *Karoola* made in all 13 voyages to Australia with invalids, the *Kanowna* 10. For reason of space an account of their valuable and interesting work must be reduced to little beyond the bare details of their collective records. Both vessels were happy in their commands, their staff, and their fortune.

PATIENTS CARRIED BY AUSTRALIAN HOSPITAL SHIPS

	To Australia.	Elsewhere.	Total.
<i>Karoola</i>	6,067	4,867	10,934
<i>Kanowna</i>	4,267	2,559	6,826
Totals	10,334	7,426	17,760

The period covered for the *Karoola* is 19th October 1915 to 27th November 1919; for the *Kanowna* 24th September 1915 to 18th March 1919.

The staff, fittings and equipment of the two Australian hospital ships changed considerably during the course of the war in accordance with the needs, which necessarily varied.³⁴ The ships were first chosen and fitted for a definite purpose, namely, to permit of the return of convalescent soldiers to Australia through the Red Sea in summer. Both staff and appointments were therefore designed for a type of service which differed considerably from that which evolved as a result of service experience which was determined by the vicissitudes of the world war developments of medical policy. Speaking gener-

³⁴ A curious illustration of this is the fact that the patients carried on the Australian hospital ships were classified as "for change", "for discharge", or "for duty". After some research it has been discovered that this classification, in the circumstances meaningless, was based on that officially laid down for British hospital ships *pre-war*—which were exclusively engaged in connection with the British Army in India.

ally the ships were used more for sickness than for wounds and chiefly for chronic cases.

Staff. As originally laid down in June, 1915, the staff of each ship comprised 12 medical officers, 9 female nurses, and 84 rank and file A.A.M.C., the latter comprising: wardsmen, nursing orderlies, general and special (*e.g.* for mental and orthopaedic work), general duty personnel, officers' servants, and so forth. On the experience of the first voyages to Australia the establishments were amended. That of No. 1 (*Karoola*) was reduced to 10 medical officers, 1 dental officer, 16 nurses and 84 rank and file A.A.M.C. The medical officers of No. 2 (*Kanowna*) were reduced to 6, and 14 "probationer nurses" replaced 14 orderlies. This inclusion of untrained personnel was objected to by the nursing service in Australia, and after the second voyage they were taken off, though the S.M.O. was "satisfied" that they were more efficient in performing domestic duties in the wards than were the male orderlies.³⁵

In August, 1917, a staff-sergeant masseur was added to the staff of each hospital ship, and in November, 1917, the staff consisted of the following: Lieut.-Colonel as S.M.O., 2 majors, 6 captains, 1 quartermaster lieutenant, 1 pharmacist lieutenant, 1 dental captain, 1 matron, 8 sisters, 12 staff nurses, and 83 warrant officers, N.C.O.'s, and other ranks, A.A.M.C. After the Armistice the staff was reduced to 7 medical officers, 7 nurses and 40 others, and was further reduced in 1920, when the vessels became, in effect, troop transports.

A hospital ship is peculiar among troop transports in the fact that, by Admiralty orders, the officer in command of the medical staff shares responsibility with the navigating officer for controlling certain movements of the vessel, if he thought fit, and could require the master to have alterations made in the fittings *en route*. Master and S.M.O. were instructed to work together for the general good of the patients. Lieut.-Colonel T. G. Wilson, S.M.O. of the *Karoola* writes:

Powers of O.C. Hospital Ship. I was appointed O.C. Troops and C.O. Hospital unit in May, 1915. A medical man is placed in exactly the same position as a combatant officer in regard to his power of discipline on board. Patients were regarded as troops and could be treated accordingly.

I was given a warrant empowering me to convene and confirm the finding of a District Court Martial and though it was not necessary to exercise this often it made a great difference in having the power to deal with disciplinary cases on board.

That the legal position was very vaguely appreciated appears

³⁵ A note made by a sister (Ruth Taylor) supports this contention. "Many orderlies had been left in Adelaide as inefficient, and had been supplemented by some V.A.D.'s as they were called. It was an important experiment, as the girls (whose tasks were mainly pantry work) did excellently and were an undoubted boon to both sisters and patients. I found them willing, clever, and obedient, and reported so."

from a note by Lieut-Colonel Gray Nicholls, who commanded in the same ship at the end of 1918:

Apparently Headquarters, London, were oblivious of the fact that the O.C. Troops was also S.M.O.

Colonel Wilson arranged for his day staff to work in reliefs, one section resting from 2-5 p.m., the other from 5 to 9 p.m. when the night staff came on.³⁶ The night staff comprised two sisters, one nursing N.C.O., and one orderly for each ward. Colonel Wilson noted:

Mental cases. The Staff included several excellent orderlies with special training in mental cases, and their services were invaluable.

Discipline and control. Staffing of wards. Sister in a ward was next in charge to the M.O. and directly responsible for anything that concerned the medical treatment and well-being of patients and, as such, could and did give orders direct to the N.C.O.'s and orderlies in the wards. I held the N.C.O. in charge directly responsible for the general discipline among patients and orderlies. The method of dividing the responsibility in the ward worked excellently and I never had any trouble in regard to dual authority.

Allotment of staff and duties in wards The General Duties Warrant Officer was also wardmaster and therefore responsible for attention to, and discipline of, patients.

To each ward was allotted at least one sister, one nursing sergeant or corporal, and proportionate number of orderlies to patients.

The Sister was responsible for nursing of and dressing wounds of patients, the preparation of patients for operations, requisitions for diets and dispensary stock; also for food; for extra nourishment from Red Cross.

The Ward N.C.O. is responsible for general discipline of patients and staff, cleanliness of wards, feeding of patients at regulated hours, and for all stores issued to each ward; also for the change of bed-clothing and personal clothing of patients at regular intervals; and for certain specific requisitions on stores.

Fittings and equipment. The hospital ships were primarily for transport, not for treatment; and only a small proportion of the invalids were "battle casualties". On the

Physio-therapy on board other hand, it was necessary to ensure that

any operative procedure undertaken should be carried out under conditions permitting standards as high as on shore. In 1916 a sergeant masseur was added to the staff—a sign of what was to be a vigorous and systematic extension of therapeutic measures.

³⁶ One orderly in turn was detailed to assist each sister with her dressings. Specially trained orderlies were detailed to attend to spinal cases.

The *Karoola's* records state :

Massage and Electrical Department. The number of stiff joints, paralysed muscles, etc., which were saved weeks and weeks of treatment later on was very great, and, if this department had only done one-tenth of the work that was done, it would have justified its existence. Two qualified masseurs and one or two unqualified assistants were employed in this department, and something like three thousand treatments would be given on an ordinary voyage.

Games also were largely exploited. Colonel Wilson says :

Physical jerks were a great benefit as the difficulty of getting adequate exercise on board ship was always an acute one. Besides this there were the usual deck games—quoits, hockey—which were played regularly by all ranks including sisters. Cricket, punching ball, medicine ball and occasional concerts and entertainments. . . . The upper boat deck was set aside for other ranks twice a week during these periods for hockey and cricket.

Colonel Gray Nicholls says :

Concerts, organised and impromptu, and lectures fill in the evenings, and in this regard cot cases are not forgotten. The day time is occupied with various deck amusements, while for the book-lover, a well supplied library furnishes ample reading matter.

The operating theatre in No. 1 Hospital Ship, the *Karoola*, was (according to Colonel Wilson)

quite up to date in its fittings—hot and cold sterilised water laid on, and all the ordinary etceteras of a first rate civil hospital. The laying on in the theatre of hot and cold sterilised water with complete sterilisation plant on a hospital ship seemed to be unusual.

Major Aspinall's experience of these facilities is recorded by Lieut.-Colonel A. M. McIntosh :

The most necessary immediate operative treatment is left in all cases to be done on the hospital ship, and for this purpose a thoroughly competent staff and good equipment are indispensable. The *Karoola* possesses these requirements to an unusual degree, and may be classed as one of the best hospital ships in the service.

Of the *Kanowna* it is recorded :

Operating theatre was an up to date if small structure on the main deck right for'ard and Major Hamilton and Major Lines kept the theatre sister busy that first trip.

The *steam laundry* usually got through 50,000 to 60,000 articles during each voyage and on a long voyage the enormous stock that would have had to be carried would have made it almost impossible to carry on

without a laundry. . . . There was no distilling apparatus on board for hospital use; but the water in tanks was good, and sufficient for ordinary requirements.

The Pathological Laboratory . . . is absolutely essential on a hospital ship. The occurrence of cases of cerebro-spinal meningitis, malignant tertian malaria, diphtheria, etc., where the early diagnosis and the early segregation of patients is so important, in itself, justifies the department. . . . Blood examinations, making of autogenous vaccines—dark ground illuminations for spirochaetae and all routine pathological and bacteriological work were regularly undertaken

The *dispensary* was well equipped and run on ordinary military lines.

The *medical care of the crew*, about 150 men, was under the hospital authorities. . . . On one occasion I had 11 of the crew and 15 orderlies very seriously ill with malignant tertian malaria. With a full ship of invalids I always calculated that there should be 12 empty cots available for such emergency cases. These 12, plus the 8 venereal cots and 6 isolation cots, reduced the accommodation for the voyage by 26.

The *X-Ray and Pathological Department* worked most satisfactorily, and radiography on board ship is an undoubted success.

The records of the *Kanowna* (Hospital Ship No. 2) are unfortunately very inadequate. One interesting comment from the O.C., Major Morse, concerning discipline states:

Spirit of troops excellent. Growling confined to a few habituals, not excluding officers, but who did not receive the support of the remainder on board. All attempts to evade authority ceased within 2 weeks of sailing. This was considered very satisfactory as the troops had a bad lead in this direction when a senior officer headed a large deputation of officers within 2 hours of embarkation at Southampton, to complain about their accommodation, etc., and who made suggestions bordering on inciting mutiny. He was cautioned. Every officer on board capable of doing duty was given it according to his disabilities. The semi-invalid officers were formed into a conversational section with duties to mix generally amongst the men, and assist in preventing the men from obtaining the idea that insularism existed amongst the officers.

Of the *nurses' quarters* Sister R. Taylor who joined the ship in London in September 1915 says:

Our quarters were confined but comfortable—two decks down. Nice mess room on promenade deck shared with medical officers. Lounge on same deck comfortable. The food was bad on the first trip. Picked up full complement of patients at Suez, about 500—250-300 cot cases and the rest walking cases.

On its first trip the *Kanowna*—improperly, as it was later discovered—carried an armed guard of 10 N.C.O's and men.

The appended tables give a picture of the clinical work in

the *Karoola*. The first gives a bare outline of the *Karoola's* work; the second an analysis of the experience with non-battle casualties until the end of 1918; the third gives the cause of the 33 deaths from these casualties.

NO. 1 AUSTRALIAN HOSPITAL SHIP *KAROOLA*—A.I.F.
PATIENTS CARRIED 19TH OCTOBER 1915 TO 27TH
NOVEMBER 1918

Patients Carried.	Deaths while on Hospital Ship.	MEDICAL WORK DONE.				
		Operations.	X-Ray Cases.	Pathological Examinations.	Dental Attention to Patients	Massage Treatments.
8,953	33	Between 60 and 70 on each trip from U.K. to Australia.	262*	2,634	2,312	1,026*

* These figures represent the activity of these departments for one trip only (19/8/16-2/12/16)—for other voyages figures are not available.

ANALYSIS OF NON-BATTLE CASUALTIES CARRIED IN
H.S. *KAROOLA* FROM SEPTEMBER 1915, TO NOVEMBER, 1918

Non-Battle Casualties.

Class

1. Age factors	9
Immaturity	2
Senility	7
2. Structural defects	53
Feet and hands	17
Hernia, etc.	32
Myopia	4
3. Occupational diseases	—
4. Dental defects, diseases	—
5. Accidental injuries	—
6. Gastro-intest. infections	842
Enteric	295
Paratyphoid	26
Dysentery	417
Diarrhoea and Enteritis	94
Abs. liver	10

7. Faucial resp. tract.

infect.	312
Influenza	96
Measles	4
Diphtheria	5
C.S.F.	12
Bronchitis	29
Pneumonia	59
Broncho-pneum.	16
Pleurisy	56
Empyema	11
Others	24

8. Neurotropic ecto-dermoses

9. Rheumatic (nodular) fever	70
10. Tuberculosis	336
Pulmonary	283
Others	53

11. Anthrax and Glanders

12. <i>Acute inf. eye, ear and nose</i>	18	26. " <i>Psycho-neuroses</i> ": secondary ..	—
Trachoma	18	27. <i>Results of moral defects</i>	—
13. " <i>Pyogenic</i> " streptococcal, staphylococcal infect. ..	19	28. <i>Organised mental disease</i>	231
I.C.T.	19	"Mental" [sic] ..	231
14. <i>Venereal disease</i> ..	77	29. <i>Dis. of endocrine glands</i>	9
Syphilis	25	Exophthalmic goitre	9
Gonorrhoea	52	30. <i>Dis. of hormonal glands</i>	11
15. <i>Transmitted thr. spec. "host"</i> ..	1,001	Diabetes	11
Malaria	980	31. <i>Neoplasms</i>	20
Blackwater fever ..	9	Cancer	11
Sandfly fever	12	Tumours	9
16. <i>Helminthiasis</i> ..	5	32. " <i>Allergy</i> "	58
17. <i>Skin infestations</i> ..	4	Asthma	58
Scabies	4	33. <i>Dis. of the nervous system</i>	172
18. <i>Specific wound infections</i>	3	Tabes dorsalis	4
Tetanus	2	Epilepsy	72
Septicaemia	1	Chorea	3
19. <i>P.U.O.</i>	399	Paralysis	43
N.Y.D. (Malaria and Spanish fever) [sic] ..	394	Sciatica	19
N.Y.D. "Other causes"	5	Others	31
20. <i>Specific physical agents</i>	120	34. <i>The organs of special sense</i> ..	92
Chr. poisonings ..	33	Otitis media	24
Burns	5	Other ear dis. ..	12
Frostbite and trench foot ..	47	Iritis	3
Heatstroke	35	Conjunctivitis ..	5
21. <i>Physiological hardship</i>	210	Others (eye) ..	30
Rheumatism	210	Nose	6
22. <i>Spec. food defects</i> ..	37	Throat	12
Beri beri	37	35. <i>Dis. of the Skin</i> ..	67
23. <i>Ac. endocrine dysfunctions</i> ..	—	Eczema	12
24. <i>Psycho-physical exhaustion</i>	—	Psoriasis	3
25. " <i>Psycho-neuroses</i> ": primary	230	Others	52
"Neurasthenia", etc.	158	36. <i>The Digestive system</i>	317
"D.A.H."	72	Appendicitis ..	62
		Colitis	88
		Gastritis	52
		Gastric ulcer ..	33
		Dyspepsia	15
		Cirrheses	3
		Jaundice	16
		Others	48

37. <i>The respiratory tract</i>	192	haematuria, (including Bilharzia), etc. ..	34
Chronic bronchitis	185	41. <i>Dis. and disorders genital sys.</i> ..	14
Others	7	42 <i>Chronic disorders of muscles, joints, bones</i> ..	117
38. <i>The Cardio-vascular system</i>	332	Necrosis	25
V.D.H.	161	Synovitis	34
Endocarditis	11	Arthritis	25
Myocarditis	24	Deranged knee-joint	33
Dil. Heart	29	43. <i>Impaired constitution</i>	399
Others	55	Debility	383
Dis. of veins	38	Unspecified	16
Dis of arteries	14		
39. <i>Dis. of the reticulo-endothelial system</i>	5		
40. <i>Dis. of excret. system</i>	170		
Nephritis	121		
Others	15		
Cystitis, stricture,		Total	5,951

The above figures are taken from a memorandum compiled by Lieut.-Col. A. M. McIntosh.

ANALYSIS OF CAUSES OF DEATH FROM NON-BATTLE CASUALTY IN H.S. KARoola FROM SEPTEMBER, 1915, TO NOVEMBER, 1918

Dysentery	2	Acute melancholia and exhaustion	1
Enteritis	1	Acute mania and exhaustion ..	1
Tuberculosis	10	Diabetes	1
Malaria	1	Cancer	3
Accident	1	Tumour of bladder	1
Appendicitis	1	Malignant kidney	1
Carcinoma of stomach	1	Cerebral abscess	1
Gastritis	1	Nephritis	3
Infect. endocarditis	1	Osteomyelitis	1
Gas poisoning	1		
			33

For the *Kanowna* detailed statistical records are non-existent. Even for the *Karoola* it has been found impossible to ascertain more than roughly the number of invalids carried who suffered from a battle casualty, and the proportion of these to the rest.

Segregation. The arrangements for segregation of special types of patients were, indeed, inferior to those made on the invalid transports. This was especially the case in respect to

"tuberculars" and "mentals". Of the latter several committed suicide. This was in striking contrast to the conditions on the invalid transports. Colonel Wilson on 22nd December 1916 reported:

The accommodation for mental cases was not sufficient for the number we carried. In England I said we could carry eight (8) patients, provided they were not violent. We were sent nine (9), four (4) of whom were maniacal, and another developed on the voyage. There are only two padded cells, and these patients necessitated doubling the number of orderlies I had arranged for the mental ward. At Durban a patient made an attempt on the life of the wardmaster, and another patient broke leave and came back in a most unruly state and had to be confined in the cells with the mental cases. In future, I will recommend that two violent mental cases and four others at the outside is all that we can carry.

The tubercular cases take up a great deal of room on board, as they have a portion of the deck assigned to them where they have hammocks slung so that they can sleep in the open, but in rough weather this part of the deck is awash and a ward with cots has to be reserved for them in case of this contingency.

Malaria on voyage. An event of interest was the outbreak, already referred to, of malignant malaria in the *Karoola* on 26th July 1917. The pathologist, Major Holmes à Court states:

The ship arrived at Sierra Leone on 13.7.17 and left on 17.7.18. On the evening of the 16th an off shore wind sprang up and many mosquitoes came on board and appear to have brought the infection, since only one patient was known to have visited the shore. Assuming infection to have occurred during the stay at Sierra Leone the shortest incubation period was 9 days, the longest possible 25. the mean time 12 to 14 days after leaving port. Mosquitoes were still found on board as late as 27.7.17. so that infection may have occurred later. Morphologically the parasites corresponded to the *Laverania malariae* (the prevailing type at Sierra Leone) the clinical course being of subtertian type. 35 cases occurred in all: 3 in the ship's company, 20 in hospital patients (two of whom died—phthisis and diabetes) and 12 in the A.A.M.C. staff.

The first case occurred on July 26th, nine days after leaving Sierra Leone, and other cases followed; 10th day—2; 11th—3; 12th—4; 13th—8; 14th—12; 15th—2; 16th—0; 17th—1; 18th—2; 19th—0; 20th—1; 21st (7th August)—1, after which no cases occurred. On later trips special precautions were taken.

The *Karoola's* fittings were dismantled and she was returned to her owners in June 1919, the *Kanowna* in July 1920. An interesting final sidelight on their service is thrown by an article

in *The Cavalry Journal* of July 1939 by a British officer who joined the *Karoola* when she was picking up at Bombay invalids from Mesopotamia for England:

The Taj Mahal Hotel, where I stayed was crowded with people going to and from the battle fronts, including many old friends. These one and all commiserated with me on my misfortune in going home in an Australian hospital ship. The "Aussies" were terrible toughs (they told me), socialists of the most rampant sort, who would very likely pinch all one's belongings, and would not dream of doing the ordinary services of a steward or orderly for an English officer. . . .

When the *Karoola* arrived in port, she certainly did look a poorish rough little boat, fitted out in a way which appeared primitive in comparison with the appointments of our own luxurious hospital ships. The frolics, too, of the details on board her . . . lent some colour to the character which my friends had given them. . . .

But these croakings proved to be quite unfounded. No one in the world could have been more obliging and pleasant than the quiet efficient little orderly who looked after me. . . . The nurses, likewise, were attentive and kind beyond words.

II. HOSPITAL TRANSPORTS

The hospital transports that carried most of the "non-cot" patients were fitted with "hammocks" and "double-tier berths".³⁷ The latter commonly comprised **Non-cot cases** about one-fifth of the total accommodation, and were used for patients whose illness or injury—*e.g.* loss of a leg—unsuited them for travel in the hammock berth, which could only be allotted to men capable of looking after themselves.

The successful repatriation by these vessels of invalids of the types for which they were employed required provision in four respects: (1) measures against those types of infectious disease that prevail on troopships; (2) a trained staff, and appropriate campaign of treatment and care; (3) technical equipment and other requirements for sick men; (4) exact arrangements to meet the special requirements of the several types of invalid.

The contrast in death rate between the records of the outward and homeward voyages is one of the most striking features of the medical experience of the A.I.F., and has been examined

³⁷ Each troopship had its small "hospital" which however commonly contained not more than a dozen hospital cots.

in some detail elsewhere.³⁸ Two factors chiefly influenced the situation on the invalid transports: *first*, the rational measures noted above to avoid over-crowding and to ensure a free flow of air through the troop-decks; *second*, the greater care taken to exclude "carriers" or incubating cases of those diseases which experience showed to constitute the chief menace on troopships—in particular, measles, cerebro-spinal fever, and pneumonic influenza. Of the last-named something more will be said presently. The circumstances of invaliding of course made such action very much easier than on outgoing troopships. Nevertheless it is impossible to acquit the authorities in Australia of responsibility in respect of certain obvious precautions in the prevention of some at least of the most important factors in the epidemic outbreaks seen among the troops on the voyage from Australia to England. This view is supported by the results obtained by the staff of the A.I.F., using its war experience, in the formidable task of repatriating the Australian Imperial Force with its large accretion of wives and children, an achievement described later in this chapter.

To these general measures must be added, the steps taken to segregate for the voyage invalids with communicable diseases—tuberculosis, trachoma, dysentery, and the venereal diseases—and to isolate sporadic cases of infectious disease.

The medical staffing for these transports was, so far as can be ascertained, peculiar to Australia. The service was a double one: (1) permanent "sea transport sections" already described, raised in Australia; (2) temporary voyage staffs, organised *de novo* under the D.M.S., A.I.F. in England for each voyage. These staffs, as already mentioned, were drawn from officers and other ranks of the medical service who were themselves awaiting return to Australia for disabilities which did not preclude the performance of such duties. In the last year of the war these were supplemented from men not of the A.A.M.C.—B2b and C class men in No. 2 Command Depot, who were trained sufficiently to carry out certain duties under the direction of the sea transport sections or the improvised staff.

Infectious diseases in hospital transports

Medical personnel

³⁸ P 670 and Vol. I, Chaps ii. and iii.

Training of improvised staffs. The instruction of the Army Medical Corps personnel was chiefly in the details of ward duty, in the case of men who had been trained only in field work. They were trained by nursing sisters in the camp hospitals in the administration of medicines and application of foment, bed making, washing and moving patients, use of bed pans and urinals, temperature and pulse taking, and serving food. The combatant "details" were trained in simple medical orderly duties, and some were also selected for instruction by the staff-sergeant masseur at the depot in "rubbing" and the elements of massage, and the use of faradic and galvanic batteries.

Technical equipment. More important from the strictly medical point of view was the fact that, while drugs and dressings were supplied from the Australian Base Depot of Medical Stores in London, the technical equipment required on the voyage for physical treatment, interim and remedial, was provided by the Australian Red Cross Society.³⁹

Three types of invalid provided special problems: (1) the "orthopaedic cases", so-called, for whom special treatment was provided; (2) patients with transmissible diseases; (3) advanced cases of mental disease.

**Special types
of invalid**

"Orthopaedic" cases. The object of treatment here was to maintain or improve the degree of recovery already reached with the view to more effective application of remedial measures in Australia. The means were chiefly massage, electrical stimulation of muscles, and ordered exercises. To what extent (if any) the first two could in themselves promote this purpose is a matter on which to-day—partly as a result of war and post-war experience—conviction is less firm than it was at this time. Similarly in the matter of "exercises", reliance at first was placed on elaborate mechanical contrivances rather than on natural movements purposefully adapted to promote the nutrition and tone of each muscle group, as in the scientific physio-therapy of to-day. There is, however, ample evidence that the combined physical and psychical influence of the procedures in conjunction with the general effect of the voyage did in no inconsiderable degree effect the desired purpose. Captain

³⁹ It included apparatus for muscular exercise and electrical treatment; and furniture for massage, also sporting apparatus.

E. B. Thomas,⁴⁰ the officer in charge of this work at Weymouth, writes:

Many (of the staff trained to continue the physio-therapeutic treatment in the hospital transports) were not suited to the work and were not keen about it; their main idea was to get back to Australia as soon as possible. But there were many good, conscientious workers among them who did their best to carry out (the purpose). Continuity of treatment was of course the ideal aimed at. I had several reports sent back to me by medical officers and trainees. Treatment was often carried out under great difficulties; where keen and enthusiastic trainees were on board good work was done.

From letter by Lieut.-Colonel Balcombe Quick.⁴¹

Just a few lines to tell you how things are going. Very well on the whole, I think. The cases have been doing well . . . wounds are healing, representing three dressing hours now as against seven and a half when coming on board first. The men nearly all say that their general condition has improved with the trip. . . . The massage and electrical staff work well. But the gym. is a "washout" (N.C.O. in charge was aggrieved at having to work while other N.C.O's did not). So much depends on the N.C.O. being keen and putting a bit of ginger into it, even if he doesn't know much about it.

Letter from Corporal J. P. Hope (Remedial Gymnastics).

After being at sea about a week and getting our sea legs we got busy. Captain Johnson arranged for me to have the sun deck—an absolutely ideal spot for the work. We were not overlooked and had full use of the deck until midday every day except Sundays. . . . I arranged a time table and had classes going from 8.30 a.m. . . . At embarkation we had on treatment 264 and during the voyage took on 34, making 298, of whom 24 were passed out as cured or for special treatment.

Letter from Warrant Officer W. Leeming (Electrotherapy and Massage).

The second day out we commenced treatment. . . . Of the 168 patients under massage and electrical treatment 140 have had very regular treatment; there are ten additions, six have been discharged to Gym. and three or four more are about ready for discharge. . . . Of the 204 patients (under the Gym. Instructor) I understand barely a half are attending treatment. . . . I fail to see any reason why men dodge treatment when they are returning to Australia; unless it is in the hope of working a pension. We tell them it will interfere with their pensions if they don't attend.

Transmissible diseases. Special provision was made for the

⁴⁰ Capt. Thomas spent some four months on special leave at the Alder Hay Hospital at Liverpool, and at Shepherds Bush in London, in training under Sir Robert Jones.

⁴¹ S.M.O. of the *Arawa* during the voyage.

various infectious types of invalid. The order covering this matter indicates that the provision was as follows:

Tubercular cases. Self-contained accommodation, with separate lavatories, bathroom, and messing, apart from the other invalids. Special medical and surgical appliances are included amongst the Red Cross stores for tubercular patients. Where tubercular bacilli have not been demonstrated in the sputum, or the patient is for any reason not regarded as infected, separate accommodation is arranged and must be utilised for these non-infective cases of which a nominal roll is supplied to the S.M.O. Every care must be taken to prevent spitting, except into special vessels.⁴²

Dysentery cases. On embarkation these men will have a large distinguishing "D" marked in red on their labels. The S.M.O. is instructed that they are to have a separate mess table and utensils and are not to be employed in the preparation of food for other men during the voyage.

Trachoma. For infective cases of trachoma separate washing, messing and sleeping accommodation is to be provided.

Venereal cases. A corner of a hammock deck is set aside and bulk-headed off for venereal disease. Separate lavatories and messing are provided, and apparatus and drugs for treatment.

Mental disease. The Australian service was particularly successful in the wise and humane treatment of these patients. A suitable officer was selected and entrusted with the task of arranging for their return, and the personal execution of the scheme devised.⁴³ Up to the middle of 1916 mental patients were sent among others on invalid transports—an arrangement productive of the utmost discomfort and anxiety. But from June 1917 they went in special drafts, by transports in which sufficient accommodation was specially fitted up to suit their requirements, and with a staff specially selected and trained and fully adequate. A "mental sea transport section" (No. 10) was formed and its direction entrusted to Major Pym, an officer with wide experience in mental hospitals and distinguished by judgment, enthusiasm, and exceptional devotion.⁴⁴

The allotted decks were as nearly as possible converted into a mental ward, and, as in a mental hospital, exact instructions were laid down for the attendants.⁴⁵ The most serious

⁴² In all 1,827 "tuberculars" were repatriated during and after the war.

⁴³ See Chap. II.

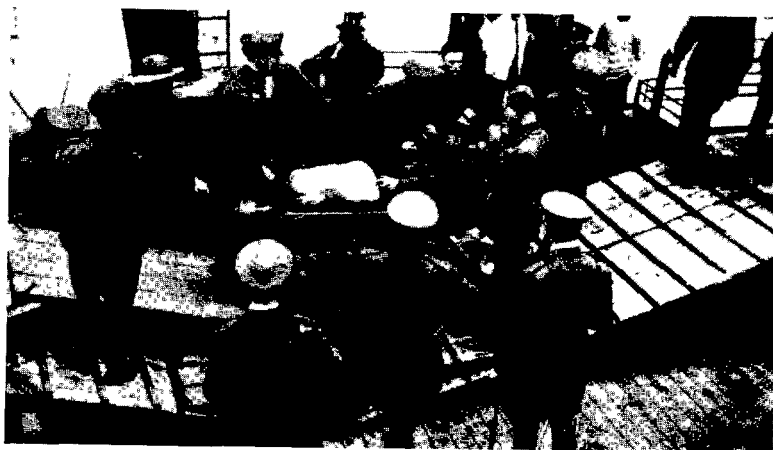
⁴⁴ It would be difficult to comment too highly on the ability and devotion with which this scheme was carried through by all concerned.

⁴⁵ The most important laid down the duty of treating every patient with kindness, remembering that they were "children". No patient must be struck or answered back, whatever the provocation. Exact instructions for routine (as for meals, prevention of suicide, cleanliness, and so forth) were laid down on the lines of scientific mental hospital procedure.



26. THE AUSTRALIAN HOSPITAL SHIP *Kanowna* LEAVING PORT MELBOURNE,
6TH JULY 1916

Aust War Memorial Collection No PR480

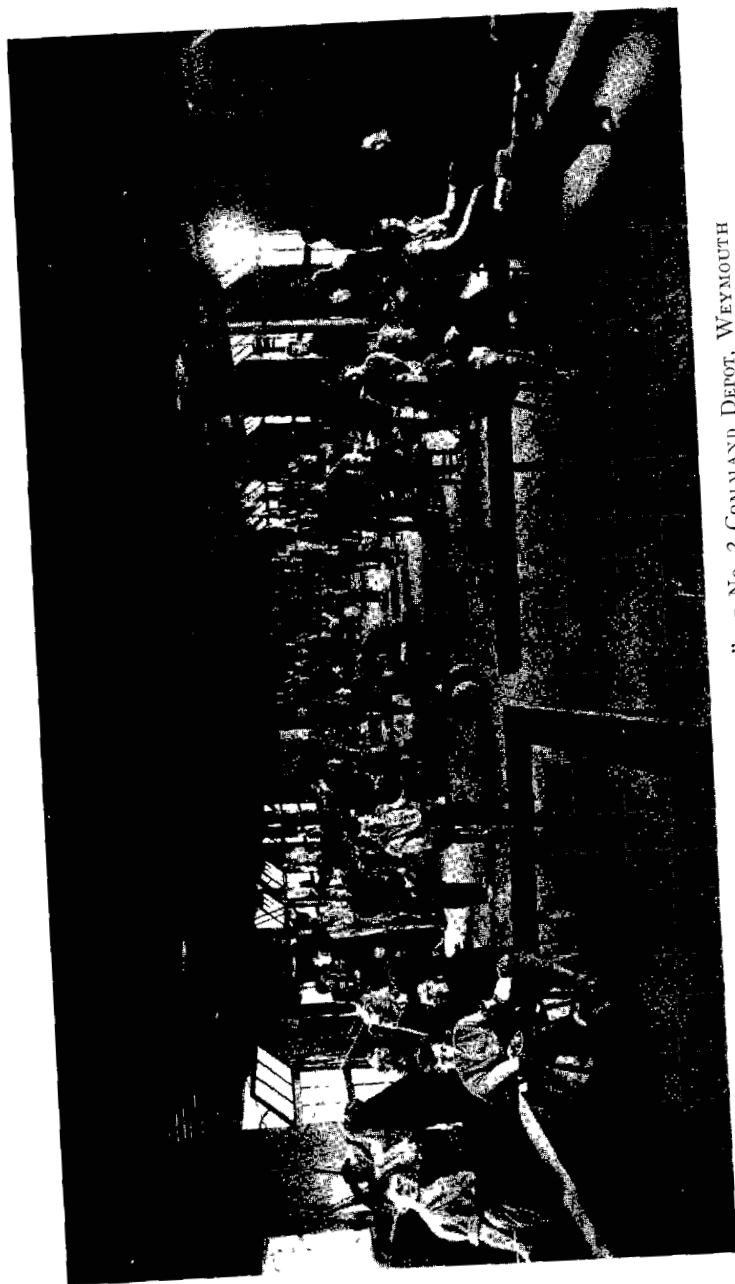


27. AUSTRALIAN INVALIDS EMBARKING ON THE HOSPITAL SHIP *Karoola*
AT SOUTHAMPTON

General Sir William Birdwood is watching the embarkation.

Aust War Memorial Official Photo No D601

To face p 704.



28. THE "REMEDIAL GYMNASIUM" AT NO. 2 COMMAND DEPOT, WEYMOUTH
Most of these men are "invalids," but some would be "regraded" for further service

To face p 703.

Photo from Colonel D. M. McWhae
Aust War Memorial Collection No H17160.

difficulty was that patients exhibiting every feature of mentally disordered behaviour—the violent, the abusive, the melancholic, the stuporose, the “wet and dirty”—had to be grouped together. The only means for combating the dangers and difficulties involved in this arrangement—which will appeal to all who have had practical experience of the care of the insane—lay in a competent and alert staff; and the strain on the staff was great. Ultimately the position was ameliorated by careful selection of the drafts.

The first batch repatriated under the improved conditions went in June 1917, when the specialist officer and an assistant, and a staff of 31 orderlies took 58 mental cases of all types. Subsequently some 300 mental invalids (apart from minor psychoses—“shell-shocks”) were sent in this manner with great advantage to the patients themselves. Indeed it is recorded that they were almost always benefited by the voyage and showed a satisfactory recovery rate. The methods adopted also ensured that “the presence of the mental cases on board was hardly known to the other invalids”.⁴⁶

The following is an extract from Major Pym’s report:

In 1917 a special Mental Unit was formed under the command of a medical officer experienced in mental diseases, for the purpose of conveying Australian mental patients from England, Egypt and South Africa to Australia. Six voyages have been accomplished, the number of mental patients on each voyage respectively having been 58, 40, 35, 87 and 91. Also 19 German mental cases were brought by the Mental Unit from Australia to Rotterdam.

The final voyage with 75 mental patients is to start in November 1919.

The Mental Unit (No. 10 Sea Transport Section, A.A.M.C., A.I.F.) was made up as follows:

1 medical officer; 1 warrant officer (wardmaster); 1 s. sgt. dispenser; 3 sergeants; 3 corporals and 24 privates.

Of these, at least 5 were men who had been trained in mental hospitals in Australia previous to the War. The rest were A.A.M.C. men, and they received special instructions and lectures from the M.O. i/c Mental Unit, during the voyages backwards and forwards between England and Australia.

Total mental staff: 1 medical officer and 32 other ranks.

The mental patients were all carried on one large troop-deck, specially fitted up for the purpose with single and double-tier berths, mess tables,

⁴⁶ In all 840 “mentals” were invalided to Australia as such. Their subsequent disposal is dealt with in *Chaps. xv, xvi*. Of 706 invalided up to 1919, only 464 had seen service in the front lines.

office, pantry, lockers, store-room, wash-place, baths, showers, lavatories and 3 single rooms. All of these were on the one deck or leading directly from the deck.

Other special arrangements were required, such as, wire netting, or 2 iron bars outside each porthole, wire guards over electric lights, batten guards round dangerous hatches or fixed ladders.

On the exercise deck, dangerous points were battened off if possible, and the sides of the ship protected with strong cord netting of 1 inch mesh (ordinary cricket netting). This proved sufficient to prevent men getting over the side. Chief reliance was, however, placed on the vigilance of the staff on the exercise deck, it being impossible to close it in owing to the necessary traffic of the ship's officials and the crew, but which never caused any real inconvenience.

For suicidal and close-observation cases, a special single-tier dormitory, enclosed on three sides only, was set apart, and special watch kept night and day throughout the voyage.

Violent cases were kept out in the open as much as possible with orderlies near them. The single rooms were rarely used, except at night time.

Mental patients were dressed in hospital-blues during the voyage for the purpose of easy identification, in case of wandering away from their deck.

Dangers of various kinds had to be guarded against, homicidal and suicidal patients requiring careful watching.⁴⁷ Also in heavy weather, the feeble patients, and some of the reckless class required protecting from accident. Cutlery was always collected and counted before the patients left their meals, and then locked away.

The recovered invalid. The largest number of invalids carried were those who had "recovered". Those who did not require any special treatment, but were not marked "unfit for training", received some training for half an hour twice a day. This was intended to prevent them "from becoming slack physically and mentally", and took the form of organised games, progressive in character, and designed to promote physical and mental tone. Well trained instructors were put on board each carrier, and every invalid carried was examined at regular intervals.⁴⁸

III. HOMECOMING OF THE A.I.F.

In one sense repatriating the A.I.F. began on 3rd February 1915, when the *Kyarra* took back to Australia 291 troops, consisting of 159 invalids and unfits, and 132 whose "services"

⁴⁷ Only one suicide occurred during the six voyages described by Maj. Pym. He attributes this directly to the special care by the staff. An analysis of the cases carried under Maj. Pym is given in the next chapter.

⁴⁸ A very complete system of recreational exercises and games was devised and is included in the records of the Command Depots. See also *Vol. II, Chap. xvi.*

were for various reasons "no longer required". By the end of 1918 some 93,000 Australian troops had been repatriated, 75,000 as invalids, 18,000 "for change", "on duty", or "for disciplinary reasons".⁴⁹ In the course of this very considerable achievement Australian Administrative Headquarters overseas had gained extensive and intimate experience in the necessary military and naval co-operation and the medical service had built up an excellent working system.

It might be expected that the experience thus gained would have formed the basis for organising the repatriation of the remainder of the force, when the war ended, and in a general way this was the case. But from the medical standpoint, at least, various interests and motives, political, sectional, personal, conspired to prevent the fullest exploitation of the experience gained during these years. Quite apart from the return of invalids the problem of repatriation of the force had begun to receive attention both in the Headquarters, A.I.F. and the Defence Department in Melbourne and was discussed at the Imperial War Conference in 1917. From the beginning of 1918 Australian Administrative Headquarters had made a close study of the problem⁵⁰ including the medical aspect, and full arrangements had been made to co-ordinate the existing repatriation system of invaliding with that of the force as a whole. It had been decided that a new department should be created largely from the staff of the Australian Corps. But the records of the Director of Medical Services show that it had been confidently expected that the experience obtained and the system built up in the repatriation of invalids—for which A.I.F. Headquarters remained wholly responsible—would be closely followed in the wider problem.

When, however, fighting ended and leaders of the Corps Staff were brought to England for this purpose the task of organisation was transferred from General White, who had drawn up the scheme, to General Monash,⁵¹ and the new organisation built up was far more separate from the existing one

⁴⁹ See in the Statistical Section of this volume the table analysing the 264,373 soldiers returned to Australia.

⁵⁰ Based chiefly on a study of the peculiarly efficient Japanese procedure in the Russo-Japanese War of 1904-5

⁵¹ See Vol. II, Chap. xxv, of which this account is a direct continuation; and *Australian Official History*, Vol VI, Chap. xvi.

than had been expected. In the early conferences the Director of Medical Services was directly represented by Lieut.-Colonel Anderson, who took part in the discussions.⁵² When General Monash created his department he appointed on the nomination of the Acting D.M.S., as medical adviser, an officer with a distinguished field record, Colonel Kenneth Smith, previously A.D.M.S. of the 4th Australian Division.

Under special instruction from General Monash, Colonel Smith, who took up his position on December 10th, worked directly under General Monash himself at the Department of Demobilisation and Repatriation the headquarters of which were situated at Grosvenor Place, some quarter of an hour's walk from Horseferry Road, and which at first worked in complete and almost abrupt independence of A.I.F. Headquarters. The organisation of this department is shown on the opposite page. Relations between it and that of the Director of Medical Services became acutely strained.⁵³

For the medical service the repatriation of the force involved a dual responsibility; for the troops and their dependants, and for its own personnel and impedimenta. Nor did this end at the homecoming. The Armistice was not, as so often envisaged, an end point; it was the beginning of new problems and labours.

1. *Responsibilities toward the troops* may be stated as—advice as to the provision to be made for the prevention and treatment of sickness among the various types of person repatriated; executive action in relation to these; provision for individual medical records of soldiers comprising (i) records relating to problems of treatment and pensioning, and (ii) clinical and general records for the purpose of history and policy.

2. *Responsibilities in relation to the medical service* were—repatriation of medical personnel and disposal of supplies, equipment and stores; and furtherance of the interests of the personnel while awaiting repatriation and in preparation for ultimate return to civil life.

⁵² Surg.-Gen. Howse, the D.M.S., was then in Australia, whence he returned in January. In his absence the D.D.M.S., Col. Millard, acted as D.M.S.

⁵³ Col. Millard, finding his views on the matter of repatriation of invalids disregarded and his advice rejected, refused to communicate with the department other than officially. Later, co-operative relations were resumed.

On 1st December 1918, the estimated numbers to be repatriated from the United Kingdom were, A.I.F. all ranks, 165,000; troops' families, 11,000; munition workers, 2,500; munition workers' dependants, 1,000; war workers, 1,500; war workers' dependants, 200; from Egypt, A.I.F. of all ranks, 19,000.

The first intimation received by Administrative Headquarters as to the rate at which demands for shipping should be made, was conveyed in a memorandum dated 4th November 1918, in which it was stated that repatriation arrangements should be made on the basis of the troops being returned to Australia within a period of nine months. A few days later, on 13th November, confidential information was received, to the effect that the troops were to be returned at the rate of 10,000 a month for the first three months, and 15,000 a month thereafter, thus providing for completion of repatriation in twelve months, assuming that 165,000 had to be carried.

At a meeting of the Empire Demobilisation Committee, held on 20th November 1918, the Ministry of Shipping put forward as the period required for the repatriation of the Australian troops, nine months. It was explained that this period depended upon the ships carrying the full numbers for which they could be fitted (*i.e.* messed) under Transport Regulations,⁵⁴ and it was pointed out, if Australian requirements were to be met by providing a sleeping billet for each man, the carrying capacity of the ships would be reduced by approximately 20 per cent. and

⁵⁴ The Australian allotment dealt in terms of hammock billets and cubic space, the Imperial allotment was based on messing capacity only. It was found to work out, on an average, that, in a space where 100 men could be seated, not more than about 80 hammock billets could be fitted. If, therefore, messing capabilities were regarded as representing 100 per cent. of a ship's trooping capacity, the maximum Australian allotment may be taken as being 80 per cent. of the Imperial allotment; and when 20 per cent. or more of the hammock accommodation was not occupied, this represented allotting troops up to only 64 per cent. (80% of 80%) of the Imperial Transport Regulation Standard.

In considering the Imperial Transport Regulations, it should be remembered that they are intended for application alternatively to either peace or war conditions. In ordinary peace-times the Admiralty have almost unlimited choice in the matter of ships, and naturally only select those eminently suitable. To the ideal ship the Transport Regulations could probably be applied in their entirety without any serious discomfort. Further, in peace-time trooping was ordinarily limited to the better seasons of the year, and none but perfectly fit men were carried. In wartime, on the other hand, emergency requirements may be held to justify crowding to an extent quite inadmissible under conditions of peace.

In the repatriation of the A.I.F., however, frequently vessels were allotted which were far from ideal as troopships, many of the men were sick or wounded, and evacuation had perforce to be pushed forward in season and out of season. The application of the strict letter of the Admiralty Transport Regulations to Australian trooping was manifestly out of the question.

the period of repatriation would thus be prolonged by $2\frac{1}{2}$ months, making a total of $11\frac{1}{2}$ months for completion. This was accepted. The arrangement confirmed Australia's stipulation for a hammock billet for every man, and recognised that the period of repatriation would thereby be prolonged.

This general policy followed an instruction from the Prime Minister, Mr. Hughes:

It is necessary, in the first place, that all things be subordinated to the task of promptly returning our men to their own country. The distance which separates them from home, their long absence from Australia, are factors which—now that active hostilities have ceased—will operate with increasing weight in the minds of our soldiers and their relatives. And, so far as all the circumstances permit, it is our duty as a Government and an Administration to bend every effort to the task of satisfying their just demands.

**The Prime
Minister's
letter**

While, however, being fully charged with the importance of prompt repatriation, it is necessary that our methods should be governed by the circumstances which the cessation of hostilities creates. Our men are no longer soldiers in the strict sense of the word; they are citizens of Australia, who, having done their duty, are returning to their own country. They should be treated, therefore, as far as consistent with the maintenance of discipline, as citizens and not as soldiers. Generosity should mark our actions where before strict routine and ironbound regulations sufficed. They should have abundance of food; in variety and quantity which the necessities of the war withheld; they should be amply provided with games, books, and all those things which go to make a long voyage pleasant. But, above all, they should be provided with ample space in which to move. The usual Admiralty regulations, framed to meet the greatest exigencies of war, applicable to short as well as long distances, cannot be regarded as desirable or applicable in the circumstances which now confront us. The Government in this respect request that 80 per cent. of the space only shall be used. Our men must return in comfort; their health must be most carefully considered, their journey through the tropics must not be rendered unbearable by overcrowding. In short, they must be treated with that consideration which their great deeds and many hardships have earned. . . .

The Prime Minister's directions that only 80 per cent. of the space should be used were interpreted by the Committee of three Australian officers (Naval and Military Board⁵⁵) responsible for the task as meaning that the full Australian allotment, *viz.*, a hammock a man, should be the minimum accepted under any conditions. Within this limit a system was laid down whereby each ship and each individual deck were considered on their merits.

⁵⁵ Maj. W. J. R. Scott, Lieut.-Commr J. K. Davis, and Lieut.-Col. L. W. Jeffries.

The British Director of Transports from the first declined to agree to any system of allotment which would result in the embarkation of less men than one for each sleeping billet. The Australian Staff continued, however, to embark only such numbers as each ship was certified by Australian officers as able to carry satisfactorily. Early in April 1919 the matter was brought to a head by the Shipping Controller drawing attention officially to the fact that we were embarking a considerably smaller number of troops than could be accommodated in the ships in accordance with the numbers fixed by the Ministry of Shipping. The Controller asked for a definite assurance that in future the accommodation as fixed by the Ministry of Shipping on a hammock a man basis would be accepted and that the troops would be embarked up to the full number.

This led to a conference later in the month. It was accepted that each ship would be inspected jointly by representatives of the Ministry of Shipping, and the Commonwealth. In one way the conference resulted, to some extent, in a deadlock. But it really solved the question, inasmuch as the Director of Transports now recognised the broad principle of elasticity in allotment where Australian troops were concerned. Our contention always was that factors other than messing and sleeping capacity should be taken into consideration, *e.g.* air space (80 cubic feet air space per man, exclusive of hatchways), ventilation, deck space, etc. Troopships were now jointly inspected, and the efforts of the Ministry of Shipping and the presence of the Admiralty Inspecting Officers at the joint inspection ensured that the necessity for the utmost economy of space was kept constantly before the Commonwealth Inspecting Officers, and that no reduction of allotment below the basis of a hammock a man was made which could not be thoroughly justified.

Under the Naval and Military Board the transports made available by the Ministry of Shipping were taken over, surveyed and fitted up, in accordance with the conditions arrived at for Australians at repatriation, for the various types of personnel involved, troops, invalids, munition workers, and soldiers' and munition workers' families.

**Fitting the
ordinary
transports**

Australian troopships. The arrangements for these were in accordance with "Standard Fittings for Australian Transports"

which taken in conjunction with the Admiralty Transport Regulations "represented the basis agreed upon with the Ministry of Shipping for the fitting of Australian transports". The standard fittings were however "considerably elaborated" . . . during the period of repatriation". Detailed particulars were set out in Appendices to the Report on the Work of the Commonwealth Naval Transport Branch in London by the Naval Transport Officer, Paymaster Commander Parker. They did not, however, differ sufficiently from those previously in use to justify any particular description here. There were six special types of fitting: (a) Troops' fittings in troopships. (b) Hospitals and other medical appurtenances in troopships. (c) Fitting for mental cases. (d) Fitting for orthopaedic cases. (e) Fitting for miscellaneous invalids. (f) Fitting of Family Ships.

The Family Ships are believed to be unique. Their fitting up has been described by a member of the Naval Transport **Family Ships** Branch as follows:⁵⁶

Fitting up of Family Ships. In carrying large numbers of married men in company with their wives and children, we were breaking new ground in sea transport. Under Imperial trooping conditions, troops proceeding overseas, as, for instance, to India or the Far East, were often accompanied by the wives and families on the strength, but these were in limited numbers only. . . .

The problem was tackled in a very thorough manner by the Military, and every endeavour was made by this Department to second their efforts by producing family ships fitted with every possible consideration for the comfort of the women and children. Many of the fittings here described are entirely novel, and it is interesting to note that, in the vessels which have recently been fitted up by the Ministry of Shipping for the carriage of soldiers' wives to India, our procedure has largely been followed. . . .

I. Selection of Steamers. . . . The most suitable vessels for use as family ships are those which have been built for the emigrant trade. . . . During the period of repatriation very little permanent 3rd Class accommodation has been available, this having all been dismantled during the war; it has been necessary to rely, therefore, almost entirely on temporarily built cabins.

II. Berthing Arrangements. The berthing together of the husbands and their wives involves a very large proportion of 2-berth cabins, with a consequent appreciable reduction in a ship's carrying capacity. The men and women should therefore be berthed separately, the men forward and the women aft, or *vice versa*. . . .

III. 2nd Class Cabins. The minimum sizes to be—for a 1-berth cabin 30 sq. ft., 2-berth 36 sq. ft., 3-berth 50 sq. ft., and for a 4-berth cabin 62 sq. ft. . . .

⁵⁶ From *Work of the Commonwealth Naval Transport Branch in London*—Period 1st Dec. 1918 to 31st Dec. 1919 (pp. 39-40).

IV. 3rd Class Cabins. The minimum sizes to be—for a 2-berth cabin 30 sq. ft., 4-berth 48 sq. ft., and for a 6-berth cabin 72 sq. ft.; no cabin to accommodate more than six women. Under the conditions prevailing during repatriation, when the proportion of infants and very young children was unusually high, the following scale was found to give satisfactory results: 25 per cent. 2-berth; 50 per cent. 4-berth; and 25 per cent. 6-berth cabins.

All outboard cabins and cabin passageways to have ports. . . .

V. Dining Saloons. Women to be provided with adequate messing accommodation and at least 40 per cent. of the seats to be fitted with backs. . . .

The men should mess on their respective decks as on troopships. . . .

If giving more space for lounges, etc., "two sittings" at the women's mess is not objected to, but on no account should a third sitting be allowed. . . .

2nd and 3rd class passengers are entitled to stewards' attendance in their saloon and sleeping quarters.

VI. Weather Decks. The allotment of additional deck space to the 2nd and 3rd class passengers (at the expense of the 1st Class space) should be considered. . . .

VII. Ladders. . . .

VIII. Women's General Hospital. Must be in a well-ventilated position, if possible, in the upper deck structure.

IX. Women's Isolation Hospital. . . . Percentage of berths and fittings should be provided as in the case of a troopship's isolation hospital.

X. Maternity Ward. To be in a well-ventilated deck and at least 10 ft. by 8 ft. It should be in a position close to permanent lavatory accommodation and adjacent to the women's cabins, and, if practicable, should adjoin the women's general hospital. . . . Hot water supply and an instrument steriliser to be available in the vicinity.

XI. Dispensary. . . .

XII. Laundry. To be provided in a suitable position, giving easy access to the women. . . . [Very completely equipped.]

XIII. Drying Room. A closed compartment with two or more radiators and facilities for hanging clothes should be provided; it should adjoin the laundry, if practicable. . . .

XIV. Women's Lounge. . . .

XV. Women's Lavatories. . . . A supply of hot fresh water should be available here for bathing babies.

Baths. One to be provided for every 30 women embarking and to be in separate rooms adjoining the sleeping quarters. Salt water and steam jet to be fitted to each bath. Showers are not required for women.

W.C's. To be on a 4 per cent. basis. One portable children's seat to be fitted to every 4 W.C's with racks for stowing when not in use.

XVI. Food Preparation Room. To be in a central position, easily accessible for all mothers, the minimum size to be 8 ft. by 10 ft. It should not be combined with the Day Nursery. *Fittings:* Sink with drainboard and fresh water supply; percolator fitted over sink; steam cooking stove, containing three or more china saucepans; bottle steriliser; draining racks for 30 or more bottles; table of convenient size for preparing food;

chair for nurse in charge; two cupboards as large as space will allow; shelf for utensils; overhead cup hooks; electric fan.

XVII. Day Nursery or Creche. To be in a well-ventilated position in the upper deck structure, and to be as large as space available will allow. A permanent Smoke Room or Lounge is very suitable for the purpose. Lounge batten seats to be fitted along each side, leaving the centre space clear for kicking pens. . . .

XVIII. Kicking Pens. Four or more, of convenient size, to be provided on each ship. . . .

XIX. Babies' Baths. Enamelled baths, one to every four infants, of a suitable size for the washing of infants to be provided by the owners of the ship. . . .

XX. Babies' Cots. Portable cots of Admiralty pattern to hang on the sides of the mother's berths to be provided for every child under three years of age, with 5 per cent. spare.

XXI. Storeroom. . . .

XXII. Issue Rooms. A canteen issue room and a free issue room for Red Cross, Comforts, and Y.M.C.A. goods should be provided in a position easy of access to both men and women.

XXIII. Husbands' Quarters. Provisions for the husbands should be made in all respects as in the case of troopships, with proper proportion of latrines. . . .

V.D. accommodation should be provided, but described by a sign which does not indicate its purpose.

It was accepted that exact provision must be made for meeting the responsibilities likely to fall on the "Department of Repatriation" in Australia. The "Comptroller" of Repatriation (Mr. D. J. Gilbert) had a representative in England fully authorised to obtain all the information necessary. He was concerned with, mainly, preparation for reinstatement, and provision for pension decisions, of which more will be seen in later chapters.

The board paper. Pension claims are based on "personal records". The most important of these was the "board paper". Its importance was at once recognised by the A.D.M.S. (Lt.-Col. Anderson) who on November 14th notes:

Our present opinion is that all men should be boarded prior to embarkation. The board paper will be filled in in the first instance by the R.M.O. of the unit to which the man belongs, who should be in the best place to judge if the man is telling the truth. Where no disability at all is brought forward by the man, question 8 will be answered only and will then be signed by the soldier. Where any disability is brought forward by the man, the whole of the board paper will be filled in and the man will appear before a board convened by the A.D.M.S. of his Division who will have specialists' opinion available should any be required, as to the question of eyesight, hearing, etc. This paper will

accompany the man on his voyage to Australia and a synopsis of the board proceedings will be copied on to the demobilisation form by the medical officer of the ship who will add any further particulars he may notice during the voyage to Australia. Space will be left on the demobilisation form which will be handed to the Demobilisation Committee on arrival, for the putting on of the finding of the final medical board to be held in Australia. I think this plan is preferable to doing the boarding on the way out because you have the R.M.O. sitting on the first board, which is really the important one.

This procedure was adopted in theory. But it would appear it was carried out imperfectly.

Personal records. The individual records of the soldier were maintained in two distinct categories: (a) administrative records (*A.F.B. 103*—Casualty Form) and the Medical History Sheet (*A.F.B. 178*). These records belonged to the Adjutant-General's Branch. They were very imperfect as clinical records. (b) Clinical records which were held by the Medical Research Council, acting on behalf of the War Office, and were intended for use as scientific records. They were a full and complete record of every individual casualty, battle and non-battle. Unfortunately it was not realised at this time that the technical problems of attribution would create difficulties greater than any faced by the medical profession in connection with the war, and that every particle of evidence available would be of the utmost value.⁵⁷ Accordingly, no steps were taken to ensure that the Australian records held by the War Office should be dealt with so as to make them available for Australian purposes—as at this time they could easily have been. The results, which cost the country dear, will appear later.

Even before the withdrawal of Australian formations from France had actually been authorised by the Commander-in-Chief there, General Birdwood had begun repatriation by sending away the longest-enlisted men on "Anzac Leave".⁵⁸ On the other hand some of the men in the training units in England were

**Process of
repatriation**

⁵⁷ Surg.-Gen. Howse was very unprecise in this matter. He stated indeed as his opinion that records would be of very little service for the purpose of pensioning and that decisions would be made chiefly on the clinical probabilities as suggested in the verbal entries on the *B 103*.

⁵⁸ This was a privilege—2 months' leave in Australia—obtained for the A.I.F. after four years' service by Mr. W. M. Hughes. The men originally sent were to return after their leave; but, of course, after the Armistice the arrangement for return was cancelled—the men were now discharged in Australia.

recent reinforcements from Australia.⁵⁹ These it was decided to send to their units on the Continent. There were then 40,000 of all ranks at the depots in England. Here the troops from France were later to concentrate, and in order to make room it was decided to clear the Command Depots of all men who had been discharged from hospital—irrespective of date of enlistment—as opportunity offered to embark them on ordinary troopships. On 22nd November A.I.F. Headquarters directed that all “C” class men should be returned to Australia, and also all “B” class men who would not be “A” class within a month. Some of these men who could not strictly be termed invalids were returned by invalid ships where classified invalids were not available to fill such vessels. By this means the depots within a month or two were ready to receive the steady flow of troops from France who came in “quotas” of 1,000 each, formed according to date of enlistment.⁶⁰

Meanwhile the mutual independence of A.I.F. Headquarters and General Monash’s new Department of Demobilisation had caused confusion in the provision of shipping—the Demobilisation Department energetically bustling in to take up its great task of repatriating the whole A.I.F., while A.I.F. Headquarters, waiting perhaps somewhat aloof, continued to carry out arrangements for the transport of invalids on the well tried lines built up through three strenuous years of failure and success. A preliminary mistake was made by Demobilisation in dealing direct with the Admiralty instead of through the Commonwealth Shipping Adviser, Commander Parker, whose long experience and knowledge of difficulties and details in connection with the shipping had been so valuable in the past and later on elicited the highest eulogy from the Director of Demobilisation (General Monash) himself. The first thing was obviously to start the great flotilla that was to land over 170,000 men back in Australia; and yet, largely owing to political misunderstandings with the Repatriation Department (which was not really a “Repatriation” Department at all, but one of Reinstatement) vital decisions had not been made.

The diary of the A.D.M.S., A.I.F. (Lieut.-Col. Anderson)

⁵⁹ A number were turned back to Australia from South Africa.

⁶⁰ See Vol. II, Chapter xxv.

on 25th November, says: "The Ministry of Shipping is simply throwing ships at us, in accordance with a statement [by the Department of Demobilisation] that we had 42,000 personnel in England, forgetting to add that about 15,000 were invalids". The import of this lies in the fact that the Ministry of Shipping had hitherto dealt almost entirely with the requirements for invalids, for whom considerably more space was necessary than for troops, and that they therefore allotted shipping for 42,000 on the invalid basis. The matter was further complicated by the fact that a number of the troops in England were on leave or on the Non-Military Employment Scheme under which men could apply to be trained in British factories, schools, and universities. Thus only a comparatively small proportion was concentrated in Command Depots and available immediately for demobilisation. The Department, in its early operations, not unnaturally failed to realise that in stating numbers for shipping requirements it was necessary to give the number ready to embark at very short notice.

It was a standing rule with A.I.F. Headquarters never to refuse a ship when it was offered, however difficult and strenuous might be the task of arranging for its fitting and filling with invalids. But the formalities of preparation and collection of men for the transports took a considerable time, and the fact that troops were not available to fill the transports made the call on the depots insistent. Also the depots themselves were caught at a moment of transition. The effect of demobilisation on the depot system was profound. Except in the case of No. 2 Command Depot, the whole procedure had to be reversed; instead of passing convalescents in order of fitness onwards to the Overseas Training Brigade, they had to be right-about-turned and passed in reverse order—*viz.*, of unfitness—to No. 2 Command Depot for return as invalids: an administrative procedure which demanded great readjustment and necessarily involved much preliminary confusion.

The result of all this may perhaps be best appreciated by short extracts from personal diaries of events at the time:

27/11/18: (A.D.M.S. 1) Had a busy morning as there was trouble over getting men for the ships we have. Instructions have come from A.I.F. Headquarters that all men of lower category than B1A3 are to

go home, and we have a lot of ships in consequence. Went to Tidworth, had a long conference with McWhae and General M'Cay. The G.O.C. Depots says that he cannot fill the ships and we had a long argument. 28/11/18: Busy on ships all day. The shipping people are showing more on the G.O.C. Depots, than he says he can take. 29/11/18: Still on ships. The G.O.C. Depots has sent a long wire protesting. Suggested that O.C. Demobilisation take the whole matter over. 2/12/18: Great to-do over demobilisation. G.O.C. objects to the number of ships he has to fill, and now all classes up to B1A4 are to go. 3/12/18: G.O.C. Depots has now taken all the ships offered. 4/12/18: McWhae has been up. He is full of beans at getting so many cases away.

By the wise advice of Colonels Kenneth Smith and Anderson to their respective chiefs a *rapprochement* was made between the departments concerned and commonsense and capable administration soon surmounted these difficulties and led to smooth working. A most complete and carefully organised system of medical arrangements was built up to meet the medical requirements of repatriation, the special feature being standardisation of fittings.

The repatriation of the medical service had to be carried out at the same time as the provision for medical care of men in the transports and at the depots. So far as this allowed, the wishes and interests of individual officers were taken into account—always with an eye on the principle laid down by the Australian Government—"first to enlist, first to return". Other considerations were professional interests, and the chance of "post-graduate" study in England or elsewhere under the A.I.F. Educational (Non-Military Employment) scheme. The medical part of this scheme, devised by Lieut.-Colonel J. H. Anderson, and carried out through the Royal Society of Medicine with its Inter-Allied Fellowship of Medicine, was not only of the utmost value to the service but formed the basis of the post-graduate system which to-day is one of the major means of maintaining in Australia the scientific standard of the profession.⁶¹

With the transfer of No. 1 Australian General Hospital from France to Sutton Veny on 15th January 1919, action was taken to close the Auxiliary Hospitals—No. 1 at Harefield, Nos. 4 and 5 at Welwyn, No. 6 at Moreton Gardens, and

⁶¹ See Vol. II, Chap. xv

the Australian Auxiliary Convalescent Home at Cobham Hall.

**Closing of
hospitals in
England**

Early in May 1919 the majority of the amputation cases were embarked and No. 2 Auxiliary at Southall also was closed; and in September it became possible to close No. 3 at Dartford.

Arrangements were then made with the War Office for the treatment of Australian sick in Queen Alexandra Military Hospital, Millbank. No. 1 A.G.H. at Sutton Veny was reduced to 200 beds in September, and in November both it and No. 1 Australian Dermatological Hospital at Bulford ceased to function.

General Howse who had resumed duty as D.M.S., A.I.F. on his return from Australia on 26th February 1919, again left for Australia on 1st November.

During the three months following the Armistice the troops were subjected to the influenza epidemic. This was the greatest obstacle with which those responsible for their welfare had to contend. In spite of the reduced numbers placed on transports during this period many ships were found to be carrying infected men, and it was only by the utmost care that the mortality was restricted.

Influenza

In three transports (*Delta*, *Ulysses*, and *Ceramic*) which left England during the last week in January 1919, carrying 4,883 troops, nearly 300 men were admitted to ships' hospitals with influenza and 8 of them died. From then onwards, however, the number of cases on the transports lessened. It was not until 21st March 1919, that the troops began to embark by "quotas" of 1,000 each; by the end of September 1919, 71 such quotas had sailed from England. These troops were conveyed to Australia with a loss of only 5 deaths from influenza and complications. The result justified to the hilt the conditions of space allotment insisted on by the Australian authorities in London.

The number of all ranks allotted for embarkation on transports from A.I.F. Depots in U.K. for the months December 1918 to September 1919, inclusive, the numbers actually embarked from depots, and the percentage under- or over-embarked, from month to month, was as follows:

Month.	Allotted.	Actually Embarked	Percentage Under-embarked.	Percentage Over-embarked.
1918 December ..	12,581	12,421	1·27	0·54
1919 January ..	12,989	12,654	2·59	
„ February ..	5,137	4,937	3·89	
„ March ..	15,282	14,738	3·56	
„ April ..	14,881	14,466	2·79	
„ May ..	16,982	17,074		
„ June ..	14,863	14,787	0·52	
„ July ..	20,191	19,808	1·89	
„ August ..	3,966	3,911	1·39	
„ September ..	8,232	8,090	1·72	
	125,104	122,886	1·77	

Long before repatriation was complete it was seen that the original estimate of numbers to be transported was much too small, largely owing to the Australian soldier's capacity for attaching to himself "dependants". The following were the figures officially given as on 31st December 1919 while the transportation was still incomplete:

	Embarked.	Remaining.
<i>From the United Kingdom—</i>		
A.I.F. of all ranks	148,545	4,200
Troops' families	15,386	3,000
Munition workers	3,124	20
Munition workers' dependants	1,409	17
War workers	1,700	—
War workers' dependants	310	—
<i>From Egypt—</i>		
A.I.F. of all ranks	16,773	—
Troops' families	52	—
Total	177,299	7,237

At the port of disembarkation in Australia the records and medical report on each soldier were collected, and each man was finally examined before discharge, and definitely given an opportunity to declare any existent disability. If found fit, a

"discharge certificate" was issued; if otherwise the soldier was treated as "returned invalid" that is to say, was held in the Army until fit for discharge, or (if his disability necessitated more prolonged attention) was passed to the Department of Repatriation for effective treatment and, if "attribution" to war experience were accepted, for pensioning. The medical problems involved in these duties, stated thus in a few words, have probably in their sum and certainly in their difficulty equalled or surpassed those of the war itself. The next two chapters are devoted chiefly to a study of these.

CHAPTER XV

MEDICAL PROBLEMS OF THE HOME FRONT

THROUGH the adherence of Japan to the Allied cause and the command of the ocean surface by Britain, the problems confronting Australians in Australia were wholly concerned with *repercussions from action at a distance*. With the immediate problems involved in the treatment and evacuation of sick and wounded in the field, and their immediate return to duty, which have been described as they presented themselves in various distant theatres of war, the home authorities in Australia had little or nothing to do. For them the main problems were (1) *the medical problems connected with the maintenance of the force overseas*; and (2) *the care of the invalids, wounded or sick, returning from the war*. Chronologically the history of the effort in Australia divides itself very clearly in two phases—before and after the middle of 1916: that is, before and after the First Battle of the Somme. The effects of that terrible campaign on the course of the war were examined in *Volume II*.¹ Its influence on the *internal history of Australia* in the war was only less profound.

The first of these phases with its problems in Australia has been described in *Volume I*,² and the sequence adopted in describing it will therefore be followed here also—first, developments in the department of the Director-General of Medical Services; next, the medical problems of recruiting in the second half of the war, and those raised by the throng of invalids that eventually turned the medical department into the busiest at Defence headquarters; and, finally, the problems of quarantine involved in the homecoming of the A.I.F.

THE ADMINISTRATIVE DEPARTMENT OF THE D.G.M.S.

In *Volume I* the development, under the Adjutant-General,

¹ *Chaps. iv and v.*

² *Chap. xxiv.*

of the Medical Department of the Australian Military Forces was followed up to the middle of 1916. The direction of medical affairs was vested in Colonel, later Surgeon-General, R. H. J. Fetherston who on 15th August 1914 had succeeded Surgeon-General W. D. C. Williams. Williams had been a permanent soldier, with a small staff adequate to the needs of the peacetime service. It is hardly credible that with the assumption by Australia of indefinite medical responsibilities for an overseas force the Department was reduced rather than increased, and Colonel Fetherston was at first a part-time officer; or that, though his work soon engrossed his full time, he served throughout the war as a militia officer on a small "composite" salary. His status was never certain and his staff at first grossly inadequate—until the end of the war it was never large

Staff enough to permit him to exercise close oversight of the affairs of the Military Districts.

In the later years of the war it comprised: (1) A small permanent "A.A.M.C." staff of a "quartermaster and honorary captain", a "quartermaster and honorary lieutenant", and several "military staff clerks" with a small civilian clerical personnel.³ (2) A medical officer as staff officer. These were "birds of passage" between civil life and the A.I.F. or the reverse. (3) A number of specialists, commissioned officers part- or full-time, responsible for direction or semi-direction or merely advice in various special departments of medical administration. (4) Certain purely advisory bodies and individuals. Eventually the work of these was taken over by permanent or semi-permanent staff.

Towards the end of 1918 the Staff Officers to the Director-General of Medical Services were:

DG1. *Lieut.-Colonel J. H. L. Cumpston* (Federal Director-General of quarantine). Adviser as to health of troops; sanitation; infectious diseases and matters relating thereto.

DG2. *Lieut.-Colonel R. B. Wade* (Consulting Orthopaedic Specialist),

³ Throughout the war the position of senior "quartermaster" was held by Capt. G. E. Sykes, who had served in a similar capacity under Col. Williams in New South Wales before Federation, a total service of 38 years, from 1899 until his retirement in 1937. It is right to say that in the military technique of administration this officer during the war "held up the hands" of his chief and several deputy-chiefs.

Throughout the medical service the "permanent" A.A.M.C. staff was essential to the smooth running of the administration by reason of the fact that they alone were fully conversant with the complex structure of military and legal regulations and orders.

Organisation, administration and equipment of orthopaedic establishments.

- DG3. *Major J. H. Downing*, Organisation and administration of military hospitals, convalescent homes, and hospital ships; surgical and electrical supplies; statistics relative to the medical services; repatriation; artificial limbs.
- DG4. *Captain G. E. Sykes*, Office clerical staff; organisation and administration of A.A.M.C. (Permanent Services, Citizen Forces, and Reserve); military orders relative to army medical services; books, forms and publications; medical services for active service and embarkation; all other questions not allotted to sections.
- DG5. *Miss T. Richardson* (Matron-in-Chief), Army Nursing Service; masseuses; domestics; wardmaids
- DG6. *Lieut.-Colonel T. F. W. Hall*, Supervision and advice regarding dental services and supplies; inspection of dental services; professional matters relating to dental services.
- DG7. *Major D. A. Cossar*, Supervision and advice regarding pharmaceutical services, and the supply of drugs and druggists' sundries; inspection of pharmaceutical services; professional matters relating to the pharmaceutical services.
- DG8. *Lieut. C. B. W. Smith*, Quartermaster's duties in military hospitals; military hospital equipment; quartermaster's work connected with A.A.M.C. units, Citizen Forces.

Military Districts. Medical affairs in the six Military Districts (practically identical with the six States) were under the direction of "Principal Medical Officers", most of them being at first part-time, but afterwards full-time officers with the rank of Colonel.⁴

⁴ The Principal Medical Officers did not change considerably after the first year of the war. The following represented the various districts.

1st M.D.	Col. A. Sutton	till— 6. 9. 14*
	Col. D. G. Croll	7. 9. 14—19. 11. 14*
	Lt.-Col. A. M. McIntosh	20. 11. 14—15. 1. 18*
2nd M.D.	Col. J. E. Dods	16. 1. 18—7. 3. 18*
	Col. A. Sutton	8. 3. 18—15. 4. 22*
	Col. T. H. Fiaschi	till—21. 4. 15*
3rd M.D.	Lt.-Col. A. E. Perkins	22. 4. 15—30. 11. 15*
	Col. E. S. Stokes	1. 12. 15—10. 1. 18*
	Col. E. Sinclair	11. 1. 18—1. 8. 21*
4th M.D.	Col. C. S. Ryan	till— 8. 9. 14*
	Col. G. Cuscaden	9. 9. 14—22. 2. 18*
	Col. A. H. Sturdee	23. 2. 18—7. 7. 21*
5th M.D.	Col. W. Ramsay Smith	till— 2. 10. 14*
	Col. A. E. Shepherd	3. 10. 14—31. 8. 15*
	Maj. A. W. Hill	1. 9. 15—31. 12. 16*
6th M.D.	Lt.-Col. H. H. E. Russell	1. 1. 17—11. 11. 19*
	Col. A. E. Shepherd	12. 11. 19—14. 12. 20*
	Col. A. T. White	till— 3. 10. 14*
6th M.D.	Lt.-Col. A. Leschen	3. 10. 14—30. 11. 14*
	Lt.-Col. A. E. Randell	1. 12. 14—15. 1. 17*
	Lt.-Col. F. J. Walden	16. 1. 17—23. 12. 19*
6th M.D.	Col. W. W. Giblin	till— 2. 10. 14*
	Lt.-Col. D. H. E. Lines	3. 10. 14—13. 5. 15*
	Maj. A. E. Sprott	14. 5. 15—15. 6. 16*
6th M.D.	Lt.-Col. D. H. E. Lines	16. 6. 16—30. 4. 17*
	Col. W. W. Giblin	1. 5. 17—13. 5. 32*

* Served in A.I.F.

The staff of a P.M.O. included one or two "quartermaster and honorary" officers, with a small non-commissioned permanent A.A.M.C. personnel and civil clerks, together with certain non-permanent officers and bodies. A Staff Officer for Invalids was also appointed in each State with the duties described in *Volume I*.⁵

Permanent Referee Board. In May 1917 Permanent Referee Boards also were formed in each Military District to decide whether men brought before them should be retained or discharged from the forces, and to guide the Deputy-Commissioner of Pensions by assessing incapacities.

Such, in general, was the administrative medical staff in Australia. Unfortunately, its actions were based not on any considered policy but on the compulsion of events. It was at first assumed that the war was to be a short one. All the arrangements in 1914-15 were dominated by this outlook and thereafter the "hand to mouth" habit appears never quite to have been escaped. Furthermore, the secondary importance attached from the beginning to medical responsibilities precluded a comprehensive scheme of provision based on a broad view and a considered estimate of future needs. Unlike other departments of the Army the medical service was without one permanent medical officer. The establishment, conditions of pay, and so forth, arranged for the medical headquarters staff in Australia were at first grossly insufficient and were never adequate.

It is true that in practice the administrative subordination of the medical service under the Adjutant-General could not be carried out. The special nature of so much of its work made it necessary that the D.G.M.S. and P.M.O's should have wide individual responsibility. Indeed, during the second half of the war (with which this chapter deals) the medical department came to overshadow all others in importance, largely owing to the unexpected flood of invalids due to the "six months' policy".

Further the medical department was subject to the universal defect of Australian military administration: although in executive functions each State (or "Military District")

⁵ *Chap. xxiv, pp. 536 et seq.*

was largely self-contained this was offset by an equally extreme degree of financial control from Defence Headquarters in Melbourne—a combination adverse to prompt and effective action.

Officially, the D.G.M.S. was the chief officer of a department of the Adjutant-General's Branch. In practice, he had to deal with the heads, first, of the other branches of the Army; second, of the A.I.F.; and, third, of the British Medical Service. Practically, toward the end of the war, he formed, with the Adjutant-General and the Finance Member of the Military Board, an administrative triumvirate. Yet he did not have direct access to the Minister, and, unless the Minister asked for him personally, his point of view was expounded by the Adjutant-General.

One result of these defects—especially of lack of staff—was marked weakness in co-ordinating the work in the six States. A member of the permanent A.A.M.C. staff has recorded:

The districts were executively autonomous to a far greater degree than under peace conditions. . . . Control by the Director-General was to a great extent indirect which allowed wide divergence in practice in the several military districts, not always to advantage. . . . The financial control from Headquarters was effective but dangerous and militated against the smaller districts. . . . The Director-General interfered much more in district matters in Victoria than in other States—he was "on the spot" there and got his experience of the working of the medical service which was essentially a district matter by trying it on the 3rd. . . . He was able to keep fairly closely in touch with his officers of this district and to visit the hospitals, consult with specialists and so forth. The work at the head office was never such as to permit him to visit extensively among the districts and he had no inspecting officer officially appointed to the position.

Records and returns were a weak point. In 1915 an attempt was made to obtain regular returns of sick from the camps, and the returns were kept up for two years. But they were never consolidated—the staff available was not apportioned with this in view.⁶

It was not till toward the end of 1918 that a deliberate

⁶ The Medical Department was not permitted to maintain a registry of its own even of essentially technical matters. In consequence these became hopelessly confused. For example the subject "Tuberculosis" was in a file with "Mental" which came about by their accidental association in the first instance and was maintained.

It is a pleasure to record that the immense mass of returns of sick in camp were in part consolidated by Mr. Thomason, senior clerk, in his spare time. They will be found elsewhere. The remarkable series of records maintained by the

attempt was made to co-ordinate procedure in the several States and maintain some direct control from the central administration in Melbourne. In August 1918, Senator Pearce, the Minister for Defence wrote to the Military Board:

**Senator
Pearce's
letter**

I am of the opinion that it is advisable that there should be established a Medical Advisory Board to advise on medical policy for the Department. This Board will consist of D.G.M.S. Chairman, and P.M.O's 2nd and 3rd Military Districts as members.

The Board will meet from time to time when convened by D.G.M.S. and will consider questions of policy only, such for instance as future extensions; T. B. cases, neurasthenic, orthopaedic and curative treatment. It will not deal with administration. It will submit its recommendations to me through the D.G.M.S.

This instruction was directly due to the importance which the service had assumed when the "invalid" problem began to bulk as the major problem of the Defence Department. The Board was established in September, 1919.

As D.G.M.S., Fetherston was made the senior medical officer of the Australian Military Forces, his rank being adjusted before his first voyage of inspection in 1915 to ensure his seniority over all officers of the A.A.M.C. abroad including the D.M.S., A.I.F., Surgeon-General Howse. With this officer he dealt direct, as he also did (through the D.A.G., A.I.F.) with General Birdwood, commanding the A.I.F. He received from Howse monthly official reports through the Commandant at Administrative Headquarters, London, but there also passed between the two a voluminous personal correspondence. At the end of his first tour of inspection overseas, described in *Volume I*, Fetherston issued on 3rd December, 1915, a "valedictory" address to the Medical Service of the A.I.F.

Prior to my return to Australia I desire to express to the personnel of the A.A.M.C. of the A.I.F. my appreciation of the work they have done during the past few months. . . .

librarian at Defence Headquarters, Mr. R. K. Peacock, is referred to elsewhere.

For a time returns from the Military Districts were overdone. The districts in fact complained, and unnecessary returns were cut out. In general it was found that a return would be ordered—such as of limbless awaiting or provided with artificial limbs—rendered for a time but not consolidated at Headquarters, and would ultimately peter out for want of control. A definite need was an enlightened control of statistics and returns, both from the point of view of effective administration at the time and of post-war organisation and intelligent appreciation of war experience subsequently. The present war effort of Australia has been definitely impeded by the failure to provide this in 1914-18.

Colonel N. R. Howse, V.C., C.B., D.D.M.S. at Anzac has been appointed D.M.S., A.I.F. . . . and I would urge upon every individual of the A.A.M.C. that it is essential for them to render him their loyal aid and support to maintain a high standard of efficiency and enhance the reputation of our corps.

Throughout their relationship, although it ended in the sharp divergence to which reference was made in the last chapter of *Volume II*, Surgeon-General Fetherston himself fulfilled loyally his exhortation. The personal correspondence discloses a "superior" attitude on the part of the overseas officer which is very characteristic of such relations. It discloses also restraint and much forbearance on the part of the home officer. The following extract is from a letter of 23rd May 1916.

I note your remarks re Capt. Do not misunderstand me—I know full well the work you are doing and the work which is before you. You have double the amount of work that I have to do, but you should just be here for one week and see what we have to combat. Outsiders never get in but at the same time they have to be treated with civility as they comprise members of Parliament, Red Cross Ladies, Governors' wives and hundreds of others who think they can run the Department better than we can. Of course one cannot be rude to them so have to use all sorts of diplomatic methods.

During his second tour in 1918 (of which more later) Fetherston inquired into the position of the heads of the medical services in the Allied countries. In England and Canada he found the D.G.M.S. on the staff of the Adjutant-General as in Australia, though in neither country could this subordination be fully enforced—"these officers in both countries," he reported, "have a very good degree of independence of action." In America the D.G.M.S.

is nominally under the Adjutant-General, but communicates direct with the Minister, and with the outside public on many matters. . . . In France and Italy the medical services are separate from the Adjutant-General's Department.

General Fetherston strongly recommended that the D.G.M.S. should be directly responsible to the Minister. The recommendation, however, was not followed.⁷

⁷ The Australian Army after 1918 followed and it would seem went somewhat beyond the British in its emphasis on the position of medicine within the Army as a department rather than a service. The dependence on the *ipse dixit* of the Adjutant-General and exclusion from resort or contact outside his jurisdiction was at the outset of the present war even more complete than before and during 1914-18.

Within a few weeks of his return General Fetherston was retired at his own request.⁸ He resolutely declined the honours and rewards which were his by full right and which were offered to him. By an unfortunate discourtesy he was subjected to an unnecessary reduction in rank; but subsequently was placed on the retired list with the rank of Major-General. He left a record of untiring energy and enthusiasm, of absolute impartiality in the difficult task of serving the conflicting demands of the A.I.F. and the Australian nation, and of whole-hearted devotion to duty in the most invidious task laid upon the shoulders of any Australian officer. The future student of Australian history seeking the record of Fetherston's work, should know, when he finds it, that he stands within the very sanctuary of the traditions of the Australian Army Medical Service.

THE MEDICAL SERVICE IN RECRUITING, 1916-18

In August 1916, after the immense losses of the First Somme Battle (including that of Fromelles) the War Office threw a bombshell. The five Australian divisions must be brought to strength to fill the gaps and the break-up of the 3rd Division was suggested as a means to effect this. Generals Birdwood and White were most anxious to avoid such an action.⁹ They urged that Australia be given the chance of saving the division, and suggested the number of reinforcements that would make the future safe. The Army Council adopted their figures which, however, were almost astronomic.¹⁰ It seems to have been forgotten that a great wave of Australian casualties from the Somme fighting was passing through the hospital system toward the Convalescent Depots and that these would soon be available.

How these and other events led to the immediate holding of a referendum of the Australian electors on the question of reinforcing the A.I.F. by means of conscription is fully told

⁸ He recommended that his deputy, Surgeon-General Cuscaden be appointed temporarily to succeed him until a suitable officer from overseas was available.

⁹ Col. R. M. McC. Anderson, an Australian business man, who made a meteoric but somewhat troubled flight through Australian Base Commands, was then in control of A.I.F. Administrative Headquarters, Horseferry Road, and was in some degree co-operating with the War Office in this matter.

¹⁰ The Army Council asked for "a special draft of 20,000 infantry additional to monthly reinforcements" while the infantry reinforcements for three months were to be increased to a total of 16,500 per month.

in *Volumes III and XI* of the Official History. Meanwhile as a method of speeding up the training of the men required and also of putting pressure on citizens to enlist voluntarily for oversea, Mr. W. M. Hughes, who had become Prime Minister, decided on the very questionable step of calling up for *home service*, under the compulsory clause of the *Defence Act* all single men between the ages of 21 and 35.¹¹

On 29th September 1916 a Proclamation calling up these men was signed by the Governor-General. With no little confusion men were drafted into camps and passed through the preliminary stages of enlistment including medical examination. It was stated at this time that the number of men in the Commonwealth between the age limits of 21 and 45 was approximately 700,000; in addition, over 318,000 men had already enlisted. The referendum taken on 28th October resulted in a majority against conscription of 72,476 out of 2,247,590 votes cast, the result being probably to some extent affected by the resentment aroused by the "call up".¹²

The "call up" necessitated examination of recruits on large and more organised lines than hitherto; moreover special arrangements for sick from the proclamation camps had to be made; and lastly a considered scheme embracing both military and civil requirements had to be substituted for the unregulated method whereby medical officers for the A.I.F. had been recruited from the civil profession.

For the examination of recruits each Military District was sub-divided into sub-districts based on Federal electorates. A preliminary examination was made of men called up at place of enrolment and a final examination at training centres, receiving depots or camps. Medical Referee Boards were also appointed in each district. The standard was as laid down

¹¹ At the same time the Government called the attention of the authorities overseas to the number of troops shown as in the A.I.F. Depots in U.K., and also the number *en route* from Australia. It promised, however, the additional reinforcements as desired.

¹² In 1914 and 1915 all troops serving in the British and Dominion forces had been raised by voluntary enlistment. On 10 February 1916 conscription in Great Britain became effective. The first dominion to enforce compulsory service was New Zealand—an Act enforcing service was assented to in August 1916 and became operative from November of that year. Canada passed a Military Service Act in August 1917 and compulsory service became operative during the winter of 1917-18. Newfoundland followed by accepting conscription in March 1918. South Africa considered it impracticable to pass legislation for enforcement.

for the A.I.F. Bad teeth were not considered in themselves to be a cause for rejection. Vaccination, inoculation and dental treatment were not made compulsory.

As conscription for oversea service was rejected the "call up" failed in its purpose and the troops were quickly released.

But it was of special interest to the medical profession as an experiment in conscription, since doctors, of course, came under the same statutory obligations as civilians. It was realised, however, that the medical man was in a special position as the interests of the civil population had to receive consideration. General Fetherston issued very clear orders. On October 2nd he addressed a memorandum to the "medical profession of Australia" on "organisation to meet requirements under war conditions". It advised that two special arrangements had been made namely:

- (a) A special procedure as to questions of exemption of medical men from ordinary military service.
- (b) Special procedure for selecting, and at the right time in each case, that particular medical officer who can best be spared from civil work to serve as a medical officer in the Australian Army Medical Service with the least injury to the requirements of the civil population and for retaining in their civil work those who are most needed there in the public interest.

It was decided that questions as to whether a given medical man should serve in the Army or otherwise would be decided by a local Exemption Court, on the recommendation of a Professional Committee. The task of organised selection should be entrusted to a District Medical Committee who, it was recommended, should categorise the medical profession in their district as hereunder:

Under 45 years, who have been granted commissions in the A.A.M.C.
Under 45 years, who have not applied for commissions in the A.A.M.C.
Over 45 years of age.

This memorandum to the medical profession was an important document since it laid down the policy which it was proposed should govern the "Mustering of the Medical Service".¹³ The proposal is a measure of the ability of the medi-

¹³ *Mustering of Medical Service in Scotland 1914-19*, is the name of an admirable study by J. R. Currie, Edinburgh, 1922.

cal profession to envisage its corporate responsibility and to organise its response. Till then little attempt had been made to co-ordinate the requirements of the A.I.F. with civil needs.

The scheme appears to have worked well. The report of the P.M.O. for the 1st Military District (Queensland) states that the most arduous medical work of the year 1916-17 arose from the War Service Proclamation. In each of the sub-districts a medical officer was assigned who acted in conjunction with the military registrar; in the main men were examined by the Area Medical Officer. It was arranged that so far as possible the examination should not be conducted in any centre by a local medical man and "all chance of favouritism was eliminated by Referee Medical Boards"—of which five were constituted in Queensland.

In Australia within a week 106,579 men had been examined. The total number who eventually reported was:

Military District	Estimated number of single, widowed and divorced men in Australia between 21 and 35 years	Reported under Proclamation in October, 1916
1st M.D. (Queensland)	25,898	33,925
2nd M.D. (N. S. Wales)	71,665	69,210
3rd M.D. (Victoria)	48,302	54,846
4th M.D. (S. Australia)	14,931	18,687
5th M.D. (W. Australia)	9,257	8,631
6th M.D. (Tasmania)	6,220	6,311
Total	176,273	191,610

The result of the medical examination is shown in Tables Nos. 17 and 18 of the statistical chapter (XVII) of this volume, but it should be noted here that, of the 114,322 found fit 36,923 entered camps of training and of this latter number after failure of the referendum 4,810 enlisted in the A.I.F., equalling 13 per cent. of the fit men who were called up. Of those available 4.2 per cent. enlisted—96 per cent. of all fit men refused to enlist. The estimated number of venereal cases amongst those reported and examined was 3,388 or an average of 1.6 per cent. The total expenditure in connection with the calling up of men under the proclamation was £368,250.

Members of the A.A.M.C. Reserve Dental Services registered by October 1916 totalled 185.¹⁴

The failure of the Conscription Referenda left the members of the medical profession wholly free to serve their country or not as they thought fit. But an interesting attempt was made in the profession in Australia to have conscription applied to it. In April 1917 the Federal Committee of the B.M.A.

The "Mustering of the Medical Service"

instructed its Chairman to approach the Federal Government with a view to the introduction of a Bill for the compulsory enlistment of the medical profession for service in the Australian Imperial Force, if three-quarters of those voting and a majority of the Branches were in favour of the proposal.

The votes cast numbered 1,361. A three-quarters majority would have required 1,021 votes. The proposal was defeated by 10 votes (350 "against", and 1,011 "for"). The returns were:

	Yes	No	Total	Majority
New South Wales	417	133	550	284
Victoria	269	143	412	126
Queensland	111	19	130	92
South Australia ..	122	20	142	102
Western Australia	53	22	75	31
Tasmania	39	13	52	26
	1,011	350	1,361	661

The medical profession in Australia consisted at the end of 1914 of approximately 4,500 qualified practitioners, very roughly one to every 1,100 of the population. General Fetherston was required to find personnel for three fields of service—the *Australian Imperial Force*, the *Sea Transport Service*, and the *Home Service*.

The Australian Imperial Force. The call for professional recruits for the A.I.F., except nurses, reached a maximum in the early months of 1917; thereafter the strength in professional officers was kept fairly stable.¹⁵

¹⁴ Their ages were: 18 to 35 years—105; 35 to 45 years—63; 45 to 60 years—17.

¹⁵ The dental, pharmaceutical, nursing and massage services were subject to a "wear and tear" which was considerably below that of the medical profession—except the nursing service in Macedonia. The non-professional elements of the service were partly recruited from "B" class within the service itself. This did not however make up for the drain on it.

The response of the Australian medical profession to voluntary recruiting in 1916-18 may be exemplified at its best by the action of South Australia, which had a reputation for public spirit and business-like method which the experience of the war entirely upheld. The P.M.O. of that State reported on the year 1916-17 as follows:

It has been the practice in this District for Medical Practitioners to be appointed to the Army Medical Corps Reserve prior to their subsequent recommendation for Commissions in the Australian Imperial Force; this procedure has resulted in a considerable augmentation of the Reserve list. . . . Practically the whole of the medical profession in South Australia is mobilised to meet all emergencies, both as regards war and civil practice.

Nearly every doctor under 45—married or single—has joined the Reserve, with the knowledge that in so doing he places himself entirely at the disposal of the Military Medical Authorities, who may call him up for whole-time Camp or Military Hospital duty as occasion necessitates. The medical profession in this State is thus organised and working under a definite scheme, which has been drawn up to meet the needs of both military and civil requirements during the present war.

This scheme has involved a careful and systematic record by the Principal Medical Officer at District Headquarters of the population of all towns and districts in the State, with the number and names of medical practitioners available. This record is naturally the Principal Medical Officer's guide when more doctors are required for military work. Although these patriotic medical men have placed their services unreservedly at the disposal of the Military Authorities, their final "call up" is not made until after a most careful consideration, both of the private circumstances of the doctor and the needs of the district from which he is to be drawn.

The operation of this organization is further extended to the possible requirements of large civil institutions. The scheme also provides for any urgent requirements of a country town or district where a 'locum tenens' may be needed. Under this scheme the members are called up in turn as occasion necessitates from time to time, and do short periods of whole-time duty in camps and hospitals. This practice, whilst ensuring the smooth running of the Department, gives the Officers called up a practical insight into the work falling to a Military Medical Officer, both in camp and hospital.

The only medical practitioners under 45 in the State who are not borne on the strength of the Reserve are those possessing German names or of enemy origin, and lady practitioners; also a few specialists not required.

Thirty-five medical men—otherwise fit, but over 45 years of age—are also on the Reserve. 126 officers, including 7 transport medical officers and 11 for the Royal Army Medical Corps, have proceeded abroad from the district. Of this number, 110 were under 45 years of age, the remainder being over that age.¹⁶

¹⁶ A somewhat similar scheme governed the recruiting of nurses in South Australia.

Major Bronte Smeaton, who had much to do with the scheme, writes:

On the outbreak of war at a general meeting of the B.M.A. (South Australian Branch) certain principles were laid down to protect the interests of those on service. One of the most important was the circulation of an undertaking by those remaining in South Australia to decline to continue attendance on patients of a doctor who had been on service, for at least a year after his return. This principle was extended to lodge practice. The Friendly Societies Association agreed to assist in the return of lodge members to the list of a returned doctor. A letter was drafted by the Council of the B.M.A. (S.A. Branch) and a copy was addressed to the Secretary of each lodge in which a doctor left patients, asking for the names of those members who had transferred to another list, and the name of the surgeon on whose list they were. The B.M.A. then wrote asking this surgeon to request the lodge to remove these names from his list for at least a year. By this means, without intervention of the returned doctor, his list was restored to him. The lodge member naturally had the option of placing his name on the list of another surgeon, not the returned doctor; but the influence of the Secretary would generally prevent this.

In anticipation of the carrying of the Conscription Referendum of 1916 instructions were issued from A.I.F. Headquarters in Australia for the formation of a Committee to control the conscription of Medical practitioners. The function of the Committee was to advise the Minister with regard to the selection of Medical Officers for service abroad and at home and to satisfy the civil requirements. The Committee was to consist of the P.M.O. as President and there were to be representatives of the B.M.A., the Hospitals, and University, and the General Practitioners. This Committee of seven members was formed at once in South Australia and prepared a roster of doctors available for service, the order in which they were to be called up, and the provision that was to be made for replacing them in their civil capacity. When the adverse vote at the referendum rejected conscription this Committee ceased to have its intended function; but it was kept intact and active by the Council of the B.M.A. and acted largely as the executive instrument of the Council in matters connected with the military service.

The above and similar safeguards introduced by the B.M.A. Council were supported, and to some extent enforced, by this State Medical Committee. The fact that more than 90 per cent. of the Medical practitioners in South Australia joined the A.A.M.C. Reserve gave this Committee, through the P.M.O., the power of calling doctors up for service. This was the weapon used if any coercion were necessary, though it seldom was. The policy of the committee was to retain their practices for absent doctors and for those who enlisted from the hospital or University before starting practice an opportunity to start on their return. All the residents at the Hospitals, and all the graduates during the war, enlisted as soon as they were eligible.

A certain number of young practitioners came from other States, often as *locum tenentes* of men on service. Now it was very undesirable that these newcomers should absorb the places that would have been occupied by our own graduates if they had not been on service. If these men showed any intention of establishing themselves they were called up for service. Any proposed sales or transfers of practices or partnerships were submitted to the Committee and allowed or not as thought just. Arrangements were made for the supply of *locum tenentes*, and instructions were given that no *locum tenens* should be imported unless he gave an undertaking to leave the State at the end of his engagement. The Hospitals undertook to make none but temporary appointments, and it was established as the usual practice for the temporary holder of a teaching appointment to pay half the fees to the former teacher if he were on active service. Medical Officers required for home service in the Military Hospitals and camps were selected by the Committee, and their civil work provided for. As Medical Officers returned and were demobilised they were either employed on home service or allowed to practise in such places and ways as did the least harm to the practices of those still abroad.

There was never any lack of men anxious to go abroad to serve with the A.I.F. From 10-20 names were always on the waiting list. The difficulty was to find them appointments.

It is unfortunately impossible to ascertain precisely the number of personnel enlisted and embarked for the A.A.M.C.,

**The total
medical
enlistment**

A.I.F.; even the exact number of medical officers is not available. Among the other ranks of the service overseas many transfers took place between combatant and medical

units.¹⁷ Considerable numbers of medical officers whose replacement by fresh men was adjudged (in the broadest sense) advantageous or "just" returned from the A.I.F.

**Limited
service**

to Australia. At the outbreak of the war, at the request of the War Office, 115 young Aus-

tralian medical men accepted commissions in the R.A.M.C. for the period of a year. Many of these were afterwards re-commissioned "for the duration". This precedent was for a short while followed by Australia also, permission being given to a few senior medical men to enlist in the A.A.M.C. for a limited period. This practice proved to be not in the interests of the Army and was soon discontinued. But it was found desirable to have a means of terminating commissions for reasons other than disciplinary or for disablement, and General

¹⁷ Surg-Gen. Howse held that men enlisted and taken overseas as non-combatants should not be transferred to combatant arms unless first returned to Australia, discharged, and re-enlisted as combatants. This was not, however, enforced.

Howse made much use of this method in maintaining the professional standard and the morale of the service. The return of medical officers to Australia and their replacement by fresh men, was found to be often of great advantage to all concerned. But this privilege, given to him by General Birdwood and accepted by the Australian Government, was rigidly (and rightly) guarded by General Howse as not to be lightly used. Further, Howse wished to enforce the retirement of all medical officers at fifty-five, but was strongly opposed in this by General Fetherston who held that men over that age were thoroughly fit for hospital work and that fitness for work should be the sole criterion.

A number of medical students, officially given as forty-one, who returned to Australia on transport duty and were given official facilities for completing their studies during the war, rejoined the A.I.F., and a high proportion served with distinction. In November, 1918, arrangements were made extending the same privilege to dental students enlisted in the A.I.F.—the number not to exceed twenty—and on the same understanding, namely that they should rejoin the military service on completion of their course if required.

The problem of securing medical officers for home service was a special one. A record of the Defence
Home service Department thus describes the position up to June, 1916.

Perhaps the greatest difficulty which has been experienced in connection with the working and organisation of the Army Medical Services in Australia, has been the continual changes in the personnel; almost all the Medical Officers who volunteered for whole time service were very anxious to proceed overseas, and were not content to remain any length of time in Australia. Thus from the beginning of the War the Medical Staff has been subject to continual changes. These remarks apply equally to the Nursing Service. As soon as Medical Officers or other personnel have become accustomed to Military routine, and had learned the rudiments of Military work, they have been sent abroad, their places being generally filled by civilians.

This difficulty has to a certain extent been overcome, as the Home Service Staff consisting of Officers and Other Ranks unfit for Active Service, have become trained in their work, so that by the middle of 1916 there existed in Australia a trained Home Service Staff.

From then onward the "six months' policy" meant a flood of returning invalids. The care of them, however, lacked the

glamour of active service, and was carried out by men who were also working in civil practice. It is not too much to say that the most serious defect in the Australian Home Service was the failure to provide a compulsory form of medical service for the attention to these men. The pay of a major, or even lieutenant-colonel was often much below what he could make in private practice; and, while this was a remote consideration at the front, it was a very unpleasant fact when a returned man arrived home—detailed perhaps for special work—to find himself expected to take up duties in a military hospital while his competitors, who had not enlisted, dug themselves in. The problem was partly solved by the organisation of the Reserve of Officers and by the creation of a system—somewhat similar to that of the consultants of civil hospitals—of specialists giving part-time service in hospitals.

The failure of the First Referendum campaign and the aggravated fall in already far-insufficient recruiting that was partly caused by the bitter strife engendered, had decisive effects upon the tasks of the Australian Medical Service at home and oversea.

**The struggle
of the
standards**

At home Surgeon-General Fetherston, who hitherto had tried to win the Adjutant-General's agreement to General Howse's policy of maintaining a high standard of fitness for the A.I.F., now felt himself bound to support the Australian Government's effort to fill the depleted force by accepting lower standards. Oversea General Howse, on the other hand, had constantly in mind two objects—first, maintaining the fitness of the force for the very active fighting in which it was constantly engaged, and, second, keeping out of the A.I.F. men who entered it with the certainty of becoming liabilities not only to the A.I.F. in the war but, as pensioners, afterwards to the nation. The records of the force indeed show that a number of men deliberately made use of this extremity to obtain the wide advantage of A.I.F. enlistment by worming their way through the medical inspection knowing that they could get out when they wished; between 14,000 and 16,000 men returned as invalids without having seen active service. Anyone who knew General Howse was aware that this kind of imposition, conscious or unconscious, and whatever its degree,

was detested by him; and also that in this and other matters the nation's financial liabilities were never out of his mind.

It may be doubted whether any feature of medical responsibility in connection with the war did more to intensify the popular contempt for a supposed lack of efficiency and alertness in the medical profession than the circumstances associated with the medical examination of recruits. The same blistering criticism has occurred in Great Britain. In a debate on the British Army estimates on 21st June 1917, "attention was drawn to alleged scandals in connection with the medical examination of discharged and rejected men". It was stated that "the appeal tribunals"—which had been set up in consequence of the alleged failure of the medical service to maintain uniformity in the classification of recruits—"had long since lost faith not only in the competence, but in the good faith of some of the Medical Boards". Sir William Macpherson, Editor of the *British Official Medical History* of the war records¹⁸ that :

it was pointed out in reply that "the Medical Boards were not so much to blame; that medicine was not an exact science, and that results which they were not capable of affording were being asked for in vain from medical examinations".

The Army medical administration and the medical profession, he says, "had been set a task which was medically and physically impossible to carry out accurately and well".

The problem, in any case a complicated one, was made more so by the fact that at the beginning of the war, as Sir William Macpherson says, the fallacy—that medicine is an exact science—dominated the Army arrangements, so that apart even from inefficient organisation, carelessness, and political and other pressure (which were the greatest factors), impossible results were expected from medical examinations.

A special character is given to the medical problem by the nature of the enlistment "voluntary" or "compulsory"—whether a disingenuous examinee is desirous of achieving or of escaping from enlistment. In voluntary enlistments the medical difficulties were found to lie chiefly in the fact that, in the first place, various grave defects such as epilepsy, a "mental" history, alcoholism, age, asthma, and so forth, might be deliberately

¹⁸ Vol. I, General, p. 128.

concealed,¹⁹ and others such as mental instability and early phthisis overlooked; and in the second place that the effects of slight disabilities such as varicocele, flat foot, and other minor deformities, previous accidents and operations, and so forth, are eminently uncertain and individual, and their military importance, like that of age, or physical standards, eyesight, hearing, and physique, difficult to assess with exactness. In the American Army the medical examination was conducted on lines in the highest degree scientific. Tests of time reaction, control, judgment, will-power, and so forth were laid down, in addition to elaborate physical examination, and it is presumed followed—whether with commensurate advantage seems doubtful.

The same was attempted and to some extent carried out in connection with British Air Force examinations. It was, however, a question still undecided at the end of the war whether "fitness" is not so largely a factor of "life" that an ordinary medical examination systematically and conscientiously conducted, and based on well considered but simple standards and principles of physical fitness, followed by close medical control of the "trying out" process, is not as effective as more sophisticated differentiation by scientific analysis.²⁰ The most effective trying out in the A.I.F. were the arrangements in the A.I.F. Depots in England in 1918, where the organisation for testing both new recruits and convalescents was based on practical graduated trials, combined with a hardening-out process, and rigidly controlled by repeated medical examinations.²¹

The struggle between Surgeon-Generals Howse and

¹⁹ By the general community the man who after repeated attempts to hoodwink the medical officers to defects that made him not only useless, but a source of danger to the units in the field (and who in some instances *calculated* on receiving his discharge) was applauded as especially heroic and to be commended. The fact that some of these men "made good" does not negative the mischievous nature of this attitude.

²⁰ A definite physical standard was set the examining medical officer beforehand, in terms of height, weight, and eyesight. His personal estimate was based on the needs of everyday life; how fit a man would become by the end of his training he could only guess—and it was often held expedient to take a chance on this. By the middle of 1917 some 60,000 enlisted men had been rejected from the *Australian training camps*. An examination of over 2,000 files in Base Records suggested that approximately 50 per cent. were discharged for medical unfitness, 25 per cent. deserted and 25 per cent. were discharged for family, business or other reasons.

²¹ Many civilians who to all appearances are to-day sound and fit for the labour market, and who can even stand the strain of work which would find many A.I.F. men wanting, and take part in sports, state as their reason for being "non returned men" that they were medically rejected. With due safeguards the method of the A.I.F. Depots in England has much to commend it.

Fetherston—the former rejecting and returning to Australia recruits who arrived in England unfit to serve, the latter questioning Howse's standards and urging that no man be returned to Australia who could be employed even in non-combatant tasks in France—has already been fully described.²²

Howse eventually imposed his convictions as to the maintenance of high physical fitness both upon the A.I.F. and upon Australia. The reply of General Birdwood to the request made by Surgeon-General Fetherston, sent on a mission to the Western Front, may be quoted as epitomising the principles that governed Birdwood's decision, which was accepted by Senator Pearce and the Australian Government.

Headquarters,
Australian Corps,
15th May, 1918.

A.I.F. Administrative Headquarters,
London.

1. Portions of the correspondence anent the matters raised by Surgeon-General Fetherston in his two letters of 13th May have not up to now been brought to my notice.

2. The points at issue appear to be.—

(i) Whether or not the situation as regards recruiting in Australia necessitates some relaxation of previous medical standards:

(ii) The disposal of men despatched from Australia and subsequently found to be unfit for service in the field.

A. As regards (i) I am well aware of the difficulties being experienced in Australia and have every desire to avoid the addition of any burden by unreasonable military demand.

From the military point of view the required standard is that of physical fitness to withstand the rigours of the present campaign. It is for medical opinion to determine the technical and professional basis of "physical fitness". I wish, however, to express the opinion that past experience proves incontestably that it is unwise to include in the enlistments for actual service in the ranks men over the age of 41, and care should be taken to ensure that all men sent forward are of sound physique. We must remember that the practically unfailing success attained by the Australian troops must to some extent at all events be attributed to the fact that the ranks have been full of really fit men who have not succumbed easily to illness as the result of the hardships of service.

B. As regards (ii), which is a general statement, the subjects at issue may be sub-divided for decision as follows:—

(a) a lack of uniformity of standard and opinion as to physical fitness between the determining medical authorities in England and Australia: and

²² Vol. II, pp 842-56 and Appendix No. 7 (pp. 906 et seq.).

(b) the advisability of finding employment for men despatched from Australia and boarded in England as unfit before actual employment in the field.

The lack of uniformity mentioned in (a) is not so much due to the lack of common and defined bases as to the inevitable lack of unanimity in human judgment as it affects medical authority on the one hand and the psychology of the soldier on the other. It is probably medically correct to say that a man under the exultation of enlistment in Australia might easily be passed by the same medical board which would reject him in England when the exultation has worn off and he had for a period undergone strenuous military training.

These are everyday practical conditions and while every effort must be made to remove their effect it is impossible to hope for a complete harmonization.

The matter mentioned in (b) is one of policy and not wholly one for military decision. There are points connected with it, however, upon which I am bound to comment.

I am prepared to employ a certain number of "B" class men in the A.I.F. but I have always kept the number to a minimum. The "B" class man can rarely be said to earn his pay—for a variety of causes. As regards employment in the A.I.F. therefore I do not wish the policy changed and those "B" class men for whom A.I.F. employment is found should in the main be men who have previously served in the field.

If the Government so wish I have no doubt that the British service could provide some form of employment for "B" class men—probably by using them in Area Employment Companies or Labour Companies. As a form of Imperial co-operation the question is one for the Government; but I would point out that firstly by placing such men in "soft" jobs an injustice is done and a bad example set to the men serving in the field, and that, secondly, it would appear to be more profitable to send competent Australian working men for labour duties, the cost being the same. Moreover, the effect on the A.I.F. of a policy admitting of promiscuous enlistment in Australia and easy transfer to a labour unit in England cannot fail to be detrimental.

W. R. Birdwood, General.

One general comment is suggested by the controversy over standards. It is a truism, but one of which Australia has taken account only since the second world war was imminent, that *the physical standard of the soldier reflects exactly that of the community*. No military training will re-create a constitution degraded in youth by inadequate or improper food or other physiological fundamentals or a physique which has been neglected or distorted. And as an example of how this actually affected the A.I.F. in the First World War the distortion of feet may be taken.

**The basis—
national
fitness**

The proportion of the Australian population found unfit for military service from deformity of feet varied from almost nothing in the senior cadets of the Commonwealth Military Forces, to about 5 per cent. in men applying for enlistment in the A.I.F. The difference represents in great measure the effect of the "civilised" footwear. Doubtless the degradation of women's feet was greater still.

As to the camps of training in Australia during this period, the problems of health and medical treatment involved no practical difficulty when once (as described in *Volume I*) the serious initial lessons had been learned. "Camp hospitals" in the nature of clearing hospitals were formed in the larger camps and evacuated their sick to the civil hospitals under a financial agreement which was subject to revision from time to time—or, in the smaller States to the "auxiliary" military hospitals.

By the middle of 1916 the camps were reported by General Fetherston "practically clear of measles and mumps and sporadic cases only of C.S.M. were occurring".²³ The troops however got their final leave prior to embarkation and (the D.G. notes) "are scarcely outside Australia when these diseases break out amongst them—we do not seem able to prevent infected men from getting away". As already stated, the Command Depots in England during the latter years of the war exactly reflected these outbreaks even so as to produce major outbreaks in France whose origin was to be traced to Australia. The interposition of a buffer period of segregation before embarkation—as was done in America in order to limit the influenza epidemic—might perhaps have saved trouble on the transports and in camps in England. Though suggested from overseas this step was found by the military authorities impracticable, chiefly, it is said, on account of the difficulty of controlling the departure of transports and breaking of leave within the camps. A much less excusable and more serious defect in embarkation was the failure to prevent an almost wholesale evasion of the system for preventing the embarkation of "unfits".

²³ Between July, 1916, and July, 1917, out of 33,600 admissions to camp hospitals in Australia 6,500 were for "influenza", to which number must be added a considerable proportion of the 5,500 cases recorded as "N.Y.D." and "other general diseases".

Fetherston wrote to Howse:

It is quite a common thing for a ship on embarking men to find that there are 200 short by desertion, and vacancies are filled up by rushing men from camps, and these are the men in most cases who have escaped final medical examination and inoculation. In addition a great number are getting away through impersonation.

THE INVALID SOLDIER IN AUSTRALIA

The problem of the invalid soldier returned from overseas was infinitely more complex and difficult than that of the Australian camps.

By the end of June, 1916 there had been returned 17,190 officers and other ranks, including 9,159 sick, 4,255 wounded, and 1,357 venereal patients. During the next thirty months ending December, 1918 the flow of invalids averaged 1,993 monthly, and by the end of 1918 49,523 sick, 24,599 wounded and 1,446 venereal patients had disembarked in Australia. The grand total returned from overseas as invalids during the war was 103,897.²⁴

The first trickle returning to Australia in 1915 was seen in *Volume I* swelling to a considerable stream and some account of a preliminary nature was given of the arrangements made in Australia during the early part of the war for meeting the manifold responsibility of their reception and treatment made necessary by the policy which returned to Australia all convalescents who were unlikely to be fit for service within six months. It is now necessary to describe how the Defence Department met the responsibility for their care until such time as they were turned over to the civil department of "Repatriation", whose task is the subject of the next chapter.

The most potent factor determining the machinery and the methods for dealing with returning invalids was on a tradition inherited from the South African War. This guaranteed to the enlisting soldier that he should be returned for his discharge to the place where he had enlisted. Moreover the soldier and his relatives were insistent that he should be treated wholly within his own State and brought strong political pressure to bear.

**An extreme
of decentral-
isation**

²⁴ The clinical analysis of these invalids is given in full in *Chap. xvii* (Statistics).

This policy had far-reaching results. It involved, for example, the duty of establishing in every State the special hospitals and medical organisation necessary for treating every type of disability suffered by the invalid soldier. Though it was found necessary to modify this rule in the interests of the soldiers themselves, it did much to preclude the provision of special treatment for various types of injury or disease, which was so characteristic of the practice in Europe. In particular it prohibited the development of special hospitals for the reparative treatment of war wounds in the last stage—the so-called orthopaedic treatment including the provision made for artificial limbs. On the medical side it precluded the staffing of any central hospitals for the type of case which more than any other called for highly trained exponents, the psychic disorders of conduct.²⁵

Soldiers and their friends insisted on specialist treatment in each of the six States. Naturally this was felt most seriously in the States with large territories and small populations, where indeed it resulted in treatment of a novel and highly specialised kind being provided in small country centres. How completely this contrasted with the position overseas the reader of previous chapters will appreciate.

The problem was complex and difficult. It related wholly to men who had reached the stage of "convalescence", or whose disablement was of a chronic or progressive nature. The medical profession in Australia had to pick up the case at the stage at which it had been left overseas with the interval of the six to eight weeks' voyage.

The authorities in Australia had some eight weeks' warning by cable of the number of invalids whom they might expect to arrive, classified by States. From the first port of call (Fremantle in Western Australia) came detailed information regarding the nature of the cases and the identity of the patients. Thus, at least in the Eastern States it was possible to make "long distance" provision for hospital accommodation, and immediate arrangements for specific types of case. It may be said at once that full advantage was taken of this by

²⁵ Canada, though she experienced apparently something of the same difficulty, did not find it impossible to carry out some degree of centralisation and worked in zones rather than in districts.

the Defence authorities. It is on record by all concerned that at no time was the general hospital accommodation for invalids from overseas lacking. At the end of 1917 nine General Hospitals were available with "about 3,200 beds". Besides these 700 were available for infectious cases, 100 for "shell-shock and nerve cases" together with auxiliary and convalescent homes accommodating 1,100, and venereal hospitals in each State. To these must be added a large number of "Red Cross Homes".

A scheme for the reception, treatment, and disposal of returned invalids was prepared in 1915, based on experience gained during the first year of the war. This was promulgated in Military Orders in 1916 in a booklet, "Instructions for Control of Invalids". Each military district (*i.e.* State) would receive and treat its own invalids at a central military hospital, and maintain accommodation for fresh arrivals. As new problems occurred revised instructions were issued in booklet form. A general system existed by which invalids were retained in the hospitals of the Defence Department only six months, the responsibility for them, if any, then falling on the "Repatriation" authorities.

Owing to the differences of condition in the several States²⁶ different systems of dealing with invalids necessarily came into use, though the guiding principles were laid down by General Fetherston. By reason of its expedition, economy, and efficiency that adopted by the 4th Military District, South Australia, was considered by the Defence Headquarters to be the best organised, and in July 1918 all districts were directed to conform to its methods with modifications required by local circumstances. This system may be summarised as follows:

All invalids were divided into two classes, (1) "cot cases" or others requiring immediate admission to hospital; and (2) those who did not require admission though they included a few who needed further hospital treatment prior to discharge. Men of the first class were sent to hospital. The rest were medically examined on arrival, and were allotted for treatment or other action before leave was granted to them. The medical examination included teeth and the urine test; men not requiring further treatment were boarded by the "Reviewing

²⁶ In New South Wales and Victoria the two great capital cities Sydney and Melbourne had both a medical school and a well-organised consultant class of specialist. South Australia though numerically very small was intellectually highly developed with a small but distinguished medical school.

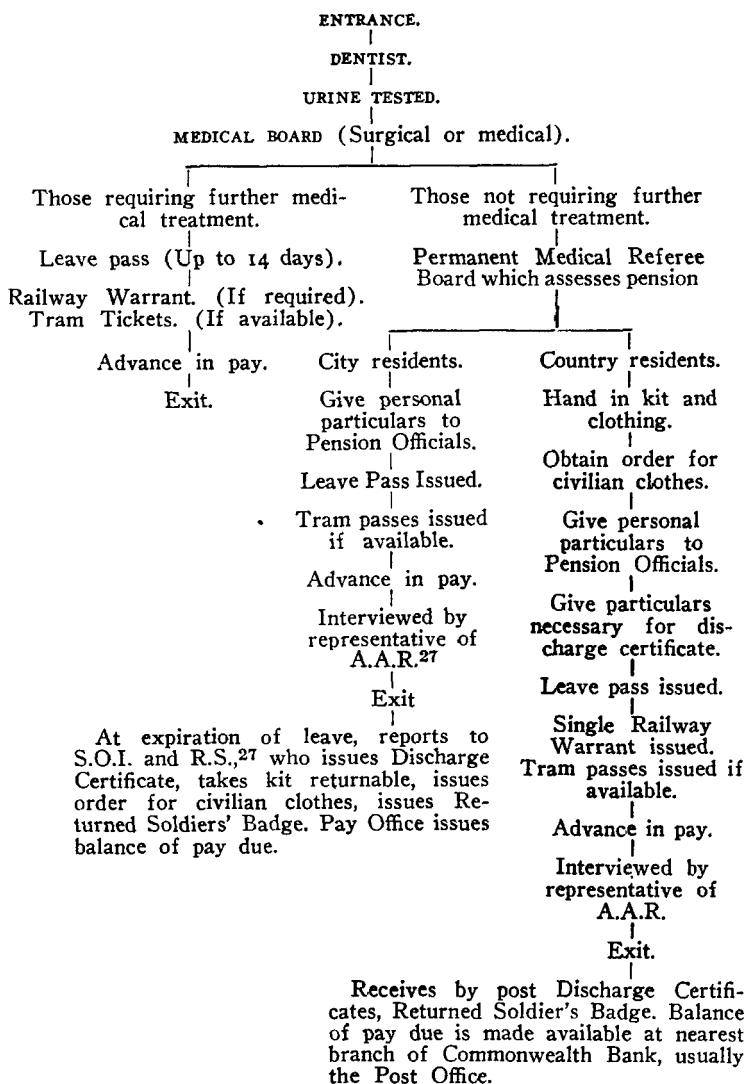


DIAGRAM OF SYSTEM OF DISCHARGE
OF INVALIDS, 1917

²⁷ Australian Army Reserve. Staff Officer for Invalids and Returned Soldiers.

Board" and their pension claims assessed. At the expiration of leave the claim of soldiers whose homes were in the State capital were finalised at the District Base, and those of country residents were finalised by correspondence.

At the expiration of leave all patients needing further treatment were admitted to the "sub-acute" side of the General Hospital according to class. After 1916 the outpatients' department was little used. Special hospital accommodation was provided for certain types of case.²⁸

The hospital system for Australian invalids was eventually largely based on the principles set out in a memorandum sent on 5th December 1916 by General Fetherston to the Secretary for Defence "Respecting the Maintenance of the Permanently Invalided and Wholly Incapacitated Soldier." The following is the official epitome:

1. In regard to soldiers wholly incapacitated (some permanent invalids) D.G.M.S. is of opinion that it is necessary that they should not be retained in military hospitals which are required for the treatment of curable cases. Incapacitated invalids may be divided into 3 classes. i. Tubercular. ii. Mental. iii. Chronic invalids other than tubercular or mental.

2. *Establishment of Sanatoria.* D.G.M.S. proposes that Defence Department establish sanatoria and homes for incurables in the larger Military Districts, and recommends that those in receipt of pensions be required to contribute towards the cost of their maintenance, but that no deduction be made until after the expiration of 12 months from date of return to Australia.

3. *Penalties for misconduct.*²⁹ Under present arrangements, penalties for misconduct on the part of patients not on military pay are not practicable except by discharge from hospital or by curtailment of privileges—it not being possible to make any deduction from pension. Deductions from pension would be the most effective and desirable means of enforcing discipline and the D.G.M.S. proposes that the Officers Commanding Hospitals shall have power to fine the men and collect the amount from the pension payable.

²⁸ Invalids for the 1st Military District invariably disembarked at Sydney, and proceeded overland to Brisbane, those for Tasmania disembarked in Melbourne.

²⁹ One of the most difficult problems of hospital administration in Australia for the A.I.F. concerned the maintenance of discipline. Even though the Superintendent might be a military officer, the punishment which he was able to award was either inadequate to prevent frequent and most disturbing breaches of discipline or else punishment was precluded by the curious sentimental halo which made the returned soldier a being more than human, and caused any suggestion that he should be amenable to rules and regulations to be resented, especially by the Returned Soldiers' Associations.

Ultimately the problem worked itself out along the lines of mutual acceptance of give and take, the Department of Defence was induced to treat the soldier not as a casualty but as a deserving citizen who had already suffered grave handicaps in his country's service; the soldiers were brought to see that their own interests required that they should co-operate with the efforts made for their recovery.

The treatment proposed by the D.G.M.S. in the case of the three classes is as follows:

Mental cases—D.G.M.S. suggests that those certified insane after discharge from A.I.F. be handed over to the State Lunacy Department—the cost of maintenance to be a charge against the soldier's pension.

Tubercular—D.G.M.S. suggests that sanatoria be provided in 1st, 2nd and 3rd Military Districts under arrangements with the State authorities similar to those adopted in the case of Mont Park.

Chronic Invalids—D.G.M.S. suggests that these could be provided for by Defence Department taking over certain homes now under State control, or by voluntary associations, forming and maintaining homes the upkeep of which would be defrayed by (1) voluntary subscription, (2) grant from Defence Department, (3) deduction from pension.

4. In the meantime D.G.M.S. recommends that *Mental, Tubercular, and Chronic Invalid* cases be dealt with in hospitals and homes (other than military hospitals), the Defence Department paying for patients' maintenance.

5. *Training, Teaching and Maintenance while being educated in suitable occupations.* Under a recent ruling of the Minister this is a matter for action by the Repatriation Trustees with whom the D.G.M.S. is to confer regarding same.

6. *Pay.* (a) The D.G.M.S. recommends—in the case of invalids not considered likely to become fit for service—that they remain on military pay for a period not longer than 4 months from the date of disembarkation, or from date of injury or commencement of illness in "prior to embarkation cases", the intention being to utilise the fourth month so as to have the pension made payable at the end of that period; and, (b) in the case of invalids who are considered likely to be fit for service *within a reasonable time*—continuance of their pay beyond three months to cover the necessary period to be authorised.

By far the most important feature of the problem was the difficulties introduced by the system of distribution of patients to their home States. Instead of creating as did the great belligerent nations, including the United States of America and in some degree also Canada, a system of centres for special treatment—orthopaedic, cardiac, eye, or neurotic cases—so that complete and exact treatment by specialists could be undertaken under military control and discipline, the State system made it necessary in the smaller States to treat almost all types of case acute, chronic and special in the one hospital, and this largely by the employment of part-time civil practitioners.

Instead of the British system—of a central general hospital with a number of secondary "auxiliary" and convalescent hospitals affiliated to it, which received the patients after the need

for urgent treatment had passed—in Australia the sub-acute and chronic patients and, at first, all types of case, were assembled within the same hospital.

The hospitals created in Australia were of two kinds: those established by the military authorities and in which the patient discipline; and the convalescent "Red Cross" hospitals organised and conducted by the Australian Branch, British Red Cross Society. The following is a fairly complete list of those organised during the war.

HOSPITALS

(Note. Some of the records are uncertain.)

- No. 1 A.G.H. (Abroad.)
- No. 2 A.G.H. "
- No. 3 A.G.H. "
- No. 4 A.G.H. Randwick, N.S.W. Opened July 1915. *See table.*
- No. 5 A.G.H. St. Kilda Rd., Melb. Opened March 1915. *See table.*
- No. 6 A.G.H. Kangaroo Point, Qld. Opened 19/7/1915. Closed June 1919. *See table.*
- No. 7 A.G.H. Adelaide, S.A. Opened June 1915. *See table.*
- No. 8 A.G.H. Fremantle, W.A. Opened July 1915. *See table.*
- No. 9 A.G.H. Hobart, Tas. Opened Sept. 1915. *See table.*
- No. 10 A.G.H. (Abroad—broken up.)
- No. 11 A.G.H. Caulfield, Vic. Opened 17/4/1916. *See table.*
- No. 12 A.G.H. Launceston, Tas. *See table.*
- No. 13 A.G.H. Enoggera, Qld. Opened 1915. Changed to No. 17 A.G.H. in 1919.
- No. 14 A.G.H. (Abroad.)
- No. 15 A.G.H. North Adelaide. Opened 12/6/1917—transferred to Torrens Park, Mitcham, on 17/5/1918. Closed August, 1919. *See table.*
- No. 16 A.G.H. Mental Wing in Mont Park. Opened 18/9/1917.
- No. 17 A.G.H. Enoggera, Qld. Changed from No. 13 A.G.H. in Jan. 1919. *See table.*
- No. 1 A.S.H. (Abroad.)
- No. 2 A.S.H. "
- No. 1 A.A.H. (Abroad.)
- No. 2 A.A.H. "
- No. 3 A.A.H. "
- No. 4 A.A.H. "
- No. 5 A.A.H. "
- No. 6 A.A.H. "
- No. 7 A.A.H. "Old Main Beach Hotel", Southport, Qld. (Never occupied.) Accepted June 1915; equipped, not needed. Returned Aug. 1917.
- No. 8 A.A.H. "Staghorn", Southport, Qld. Opened Oct. 1915.

- No. 9 A.A.H. "Finchley", Toowoomba, Qld. Opened 10/4/1916. Closed 11/11/1916.
- No. 10 A.A.H. No records available.
- No. 11 A.A.H. See No. 12 A.A.H.
- No. 12 A.A.H. Blackheath, N.S.W. Opened 23/9/1915. Closed 17/5/1916. Designation changed to No. 11 A.A.H. from 20/4/1916.
- No. 13 A.A.H. Broughton Hall, Sydney (Mental). Opened Oct. 1915. *See table.*
- No. 14 A.A.H. Convalescent Hospital at Mont Park. Closed 26/3/18.
- No. 15 ?
- No. 16 A.A.H. North Adelaide. Opened 21/9/1915. Closed 31/12/1916.
- No. 17 A.A.H. Torrens Park, Adelaide. Opened 13/1/1916. Transferred to N Adelaide 17/5/18 (changed places with No. 15 A.G.H.). Closed 30/4/1919. *See table.*
- No. 18 A.A.H. Perth, W.A. *See table.* (Used for phthisical patients before their transfer to Wooolooloo. Later, post-operation.)
- No. 19 A.A.H. "The Rocks", Albany, W.A. Opened October, 1915. Closed October, 1917.
- No. 20 A.A.H. "Biddles" Fremantle, W.A. *See table.* (Run with No. 8 A.G.H.)
- No. 21 A.A.H. George's Heights, Mosman, N.S.W. Opened 1/11/1917. (Converted from Details Camp at George's Heights). *See table.*
- No. 22 A.A.H. "Wooolooloo", W.A. (T.B.). Opened 13/2/1917. *See table.*
- No. 23 A.A.H. "Hornsey", Launceston. Opened 17/4/1918. Closed 22/9/1919. *See table.*
- No. 24 A.A.H. "Stromness", Cottesloe, W.A. (Mental.) Opened 4/4/1918. *See table.*
- No. 25 A.A.H. Hobart, Tas. Closed 1/3/19. *See table.*
- No. 26 A.A.H. Fremantle, W.A. Opened Jan. 1919, as the medical section of No. 8 A.G.H.
- No. 27 A.A.H. "Rosemount", Qld. Opened 1/7/1918. *See table.*
- No. 28 A.A.H. Leichhardt, N.S.W. (Mental). At first associated with Broughton Hall (13 A.A.H.) but separated on 1/5/1919.

TUBERCULOSIS

- "Kyooma", Stanthorpe, Qld. Opened 18/12/1916. *See table.*
- "Boddington", Red Cross Sanatorium, Wentworth Falls, N.S.W. Opened 19/6/16. *See table.*
- Military Wards at North Head, Sydney.
- "Lady Davidson", Red Cross Sanatorium, Turrumurra, N.S.W.
- No. 1 Military Sanatorium, Macleod, Vic. Opened 11/8/1916. *See table.*
- "Bedford Park", South Australia. (A State Government Hospital used for T.B. soldiers.)
- Austin Hospital, Victoria, allotted 3 wards to military patients, 5/9/1917.
- "Nunyara", South Australia. Opened 1/1/1918. *See table.* (Staff not given.)
- State Sanatorium, Newtown, Hobart, Tasmania, contained military wards.

VENEREAL DISEASE

Lytton, Qld. Camp Compound. Opened 14/7/1916. Closed in 1918 and patients transferred to Enoggera.

Milson Island, N.S.W. Opened 14/10/1915. *See table.*

Langwarrin, Camp Hospital, Vic. Opened 13/3/1915. *See table.*

Torrens Island, S.A. Opened 15/10/1915. Closed 15/9/1917. *See table.*

V.D. Compound, Blackboy Hill, W.A. Closed 19/12/1916.

Camp Hospital, Rockingham, W.A. Opened 19/12/1916. Transferred to Karrakatta, 1/1/1919. *See table.*

INFECTIOUS DISEASES

No. 4 A.I.D. Hospital, "Rosemount", Qld. Opened 1/4/1916. Closed 28/2/17. (Became 27th A.A.H.)

Coast Hospital, Little Bay, Sydney, N.S.W. Infectious military patients were sent here.

Infectious Block, Liverpool Camp Hospital.

No. 5 A.I.D. Hospital, Glenroy, Vic. Opened June 1915. Closed Jan. 1917.

Isolation Hospital, Ascot Vale, Victoria. Opened Jan. 1917. Closed 9/9/18.

No. 6 A.I.D. Hospital, North Adelaide, S.A. Opened 8/12/1915. Closed 1916. (15 A.G.H. was opened in the same building in 1917.)

Infectious Diseases Hospital at Albany, W.A. (received military patients).

MENTAL CASES

No. 16 A.G.H. and Nos. 13, 24 and 28 A.A.H.

CAMP HOSPITALS

The hospitals at all the large camps—Enoggera, Liverpool, Broadmeadows, Mitcham, Blackboy Hill, Claremont and so forth—were rather in the nature of clearing hospitals, sending all serious cases to the military or civil general hospitals. In New South Wales "Camp Casualty Clearing Stations" were established at the following camps: Liverpool, Goulburn, Dubbo, Rutherford, Kiama, Menangle, Cootamundra, Bathurst, Armidale, Newcastle. Surgical and more serious cases were transferred to the local hospitals at these towns, but all others were treated in camp.

It was estimated that for every 1,000 men in camp provision must be made for 12 patients in wards and 38 in tents. Thus in a camp of 2,000 a hospital hut with 24 beds and five hospital marquees would be provided.

DETAILS CAMPS

"Details Camps" originally established to receive convalescents returning to training camps were also used to receive some invalids from overseas. One of the largest was at George's Heights, on Middle Head, Sydney. Others were at Enoggera and Karrakatta.

TABLE OF MILITARY HOSPITALS IN AUSTRALIA

Hospital	1st M.D.	Beds	2nd M.D.	Beds	3rd M.D.
General Hospitals	6 A.G.H. Kangaroo Point.	270	Garrison Hosp. Vic. Barracks	100	5 A.G.H. Melbourne
.	13 A.G.H. Enoggera	300	4 A.G.H. Randwick	913	11 A.G.H. Caulfield
Auxiliary Hospitals ..	27 A.A.H. Rosemount	109	21 A.A.H. George's Heights	420	
	8 A.A.H. Southport	—			
Special Hospitals					
Mental			13 A.A.H. Broughton Hall	71	16 A.G.H. Mont Park
T.B.	"Kyooma"	41			No. 1 Mil. Sanatorium
V.D.			Milson Is.	110	Langwarrin Derm. Block 17 A.A.H.
Infectious Diseases ..					
Voluntary Hospitals					
Red Cross			Boddington (T.B.)	100	

SHOWING NUMBER OF BEDS AVAILABLE, 30/6/18

Beds	4th M.D.	Beds	5th M.D.	Beds	6th M.D.	Beds	Total Hospitals
100	7 A.G.H. Adelaide	320	8 A.G.H. Fremantle	600	9 A.G.H. Hobart	80	11
520	15 A.G.H. Adelaide	220			12 A.G.H. Launc'tn.	127	
	17 A.A.H. Adelaide	150	18 A.A.H. Perth	50	23 A.A.H. Launc'tn.	29	9
			20 A.A.H. Fremantle	50	25 A.A.H. Hobart	35	
			26 A.A.H. Fremantle	128			
42			24 A.A.H. Cottesloe	30			3
80	Bedford Park— Nunyarra	59 22	22 A.A.H. Woorooloo	37	Military Wards at State Sanatorium	28	6
— 49	Torrens Island	145	Rockingham	30			5

No. 17 A.A.H.	2	1			7	20	3	4	
No. 18	1				4	5	1	1	
No. 27	1				1				12
No. 23		1	1		7	24	2	3	
No. 25					3	18	3	6	1
No. 21	3			1	1	10	3	4	1
			2	1	12	25	1	2	13
<i>Special</i>									
<i>Mental</i>									
No. 24 A.A.H.	1				3	4			
<i>T.B.</i>									
"Kyooma"		1			5	15			
No. 1 Military Sanatorium	2	1			5	10	1	4	
No. 22 A.A.H.	1				2	3	1	2	
<i>V.D.</i>									
Milson Island		1	1						
Rockingham	1				1	1			

(Note. Here also the records are incomplete.)

Nearly every one of the general military hospitals gradually accumulated around buildings acquired in various ways and often most unsuited for the purpose.³⁰ Until

Buildings

the end of the war little attempt was made to create a hatted hospital designed to fulfil the purpose required. Only in the Police Hospital St. Kilda Road and in the Caulfield Hospital (No. 11 A.G.H.) was accommodation deliberately designed for hospital purposes. The auxiliary hospitals and convalescent homes were mostly housed in private houses lent or rented to the Government for the purpose. Although the loan or gift was in many instances an act of real generosity and public spirit, this practice proved unsound. The buildings were often so unsuitable as to be useless and, except for some used as convalescent homes, they were difficult to work and expensive to maintain. Red Cross homes formed a considerable part of the organisation available to General Fetherston. But here, as overseas, experience proved that the efforts of a voluntary association however valuable must not be permitted to be used as a substitute for services which were a proper responsibility of the military directorate.

The staffs of military hospitals were broadly as laid down by the British War Office, but great difficulty was experienced in determining the most suitable staffing

Staffs

of hospitals of so many types and sizes. There were difficulties in the use of male orderlies and especially in their attachment for training. Usually it was found advantageous to employ a full establishment of nurses together with a proportion of ward attendants.

In Australian military hospitals the discipline of the soldier under treatment was at first a problem of much difficulty. The following observation made by

Hospital discipline

General Fetherston on Canadian experience is entirely in accord with that of the Australian hospitals:

It was found highly desirable that the military hospitals be staffed by medical officers with overseas service. The reasons adduced were:

(1) That discipline cannot be maintained by civilian organisation and that treatment therefore suffered.

³⁰ Thus for No. 4 A.G.H. (Prince of Wales Hospital, Randwick) and No. 13 (later 17), Enoggera, Government buildings were taken over.

(2) That the men disliked and resented to be looked after by personnel who had never been out of Canada.

(3) That the staff of selected C.E.F. officers who had been trained specially in the treatment of war disabilities were more efficient than civilian medical officers, who had no experience of general service or of methods adopted in England in connection with war injuries.

This was provided for by *systematic interchange of officers between Canada and the seat of war.*

It seems obvious that a clear-cut administrative line should be drawn between the soldier while under treatment within the Army organisation, and the soldier when discharged. The technique of discipline applied to soldiers and civilians is different. In military hospitals discipline should be maintained—so far as is necessary to achievement of the purpose in view—with no permitted derogation to the essential requirements of authority, though with a minimum of compulsion. In the civil unit the ordinary “give and take” necessary in any social structure may be relied upon to create a sense of mutual co-operation.

In September 1917 the attention of the D.G.M.S. was directed to the difference in the average daily cost of Australian military hospitals in England and in Australia, the average cost per bed overseas being 4/10d. daily and in Australia 7/9d. In explaining the high cost of military hospitals General Fetherston contended that they were not comparable with civil ones. He outlined the differences as follows:

MILITARY HOSPITALS

1. Many returns are necessary.
2. Elaborate records are needed.
3. Necessity for large provision for emergencies, so beds are often empty.
4. Large staff is necessary for emergencies.
5. Medical boards take a lot of time and work.
6. Military training has to be carried out.
7. Professional training is necessary for men going overseas.

CIVIL HOSPITALS

1. Practically only one return required.
2. No records except medical.
3. Beds are generally well filled and rarely empty.
4. Constant staff kept fully employed.
5. None.
6. None.
7. Nothing similar.

- | | |
|--|--|
| 8. Paid staff | 8. Honorary staff. |
| 9. No probationer nurses employed. | 9. Many probationer nurses employed. |
| 10. Patients are not permitted to be ordered to assist in work of Hospital. | 10. Patients are expected to assist if they can. |
| 11. Personnel and patients are given clothing and equipment. | 11. Clothing and equipment generally provided by personnel and patients. |
| 12. Department does all laundry work for hospital, personnel and patients. | 12. Only the hospital laundry work is done. |
| 13. No financial control by O.C. | 13. Full financial control by manager. |
| 14. No control of the purchase of supplies. | 14. Full control. |
| 15. Patients are all paid while in Hospital, so they are not so eager to get better, and all methods which aim at rapid finalizing are a financial saving and an advantage in rapidly regaining service of soldier and for this purpose extra expense is incurred. | 15. Patients lose pay, and so are eager to get better. |

The cost of military hospitals was constantly kept under notice and in September 1918 the whole question of their staffing was reviewed at a conference held at the D.G.M.S. office. Certain changes were made with the object of maintaining efficiency with economy.

General Fetherston's division of incapacitated invalids into "mentals", tuberculars", and "other chronic invalids" corresponded in its first two categories with what afterwards proved to be the "big three" of pensioning, the third of this three being soldiers who had lost a limb. The problem of the tubercular invalid will best be described in the next chapter, on pensioning, with which it was most intimately associated. Fetherston's "chronic invalids" comprised, besides the "limbless" a heterogeneous assortment of battle and non-battle casualties together with a hardly less significant residue of "prior to enlistment" deformities and diseases with varying content of "aggravation"—fibrosis, nephritis, dyspepsia—whose significance also largely concerns the problems of pensioning.

The arrangements made for the disposal and treatment of

men invalided for conditions referable to the mental equipment of the soldier took form and shape gradually and independently in each State. Only slowly did a consistent and integrated policy and understanding evolve.

Mental cases

Psycho-neuroses. Two facts emerge strongly from the records. *First* that the advice given by Major Campbell on his experience of Gallipoli patients at No. 2 A.G.H. was very imperfectly implemented in either policy or action. There is ample evidence that in many cases popular emotion and official weakness coincided in making men with "nerve trouble" permanently incapable of helping themselves.

In the *second place* there was a wide overlap between "neuroses" and "psychoses". The borderline class was as much between a "neurosis" and a "true psychosis", as between "sanity" and "insanity". Whether this overlap is inherent in the psycho-pathology of the two groups or was the product of clinical and scientific uncertainty is not easy to determine.

In this, as in other medical matters, for the first three years of the war each Australian State was largely a "law to itself" and a very wide discrepancy in practice grew up, especially as to whether these cases should be treated under military control or discharged early to civilian treatment. At first they were taken into General Hospitals without any exact discrimination. In New South Wales and Victoria, mainly on the initiative of the State Mental Departments, attempt was made to segregate them under specialist treatment. But speaking generally there is no evidence that the Defence Department seriously grappled with the problem until 1918, when big reforms were initiated in every branch of finalising treatment. On 17th June 1918 the Deputy Director-General of Medical Services, General Cusaden, called a conference of the State P.M.O's and a number of important specialists in mental disorder.³¹

The Psychoses. The treatment and disposal of mentally

³¹ Col. Eric Sinclair, Med. Sup. Gen. of Insane, N.S.W., Lieut.-Col. H. A. Embling; Hon. Col. W. B. Vance, O.C. No. 5 A.G.H. later O.C. No. 11 A.G.H.; Lieut.-Col. E. Jones, Consultant Alienist, to Defence Department; Lieut.-Col. Sir R. R. Stawell, Consulting Physician 3rd M.D.; Major A. V. M. Anderson, Consulting Physician, No. 5 A.G.H.; Major S. G. Catchlove, Registrar and later C.O. No. 5 A.G.H.; Major S. V. Sewell, Neurologist, No. 11 A.G.H.; Major C. G. S. Godfrey, Consultant Alienist.

afflicted soldiers of the A.I.F. was based on the strange—though ethically arguable—premiss insisted on by the Returned Soldiers' Association—that the insane soldier should not be acknowledged to be insane (because of the stigma attaching to insanity) but should be treated without any certificate of insanity and apart from civil patients. This required that either a complete system of mental hospitals should be created for the comparatively few A.I.F. "insane", or the different types of mental patient should be treated together—a reversal of the modern lines of advance. The result was in many ways detrimental to the soldiers' interest, but the line of thought which led to it was well expressed by the Inspector-General of the Insane, Colonel Sinclair (one of the most eminent Australian alienists and administrators) in a letter to General Fetherston urging the establishment of special interim hospitals after the type of that established in New South Wales (Broughton Hall).

The desire to avoid certification is prompted by the public sentiment that soldiers should be spared, as much as possible, the stigma of being branded as insane. It will be noticed, however, that the special Act in force in Victoria still requires a certificate and that the difference between certification of a civilian and a returned soldier is merely that the latter is effected by a military officer, the former by two medical men. I am of opinion that in the long run this will not fully achieve its object as the stigma arises, not because of certification, but because of detention in a hospital recognised as one for mental cases solely. . . . The most practicable method of achieving this result is to utilise a hospital which also admits cases other than mental, *vis.*, all classes of nerve strain, and is maintained as a military hospital. Residence in such an institution does not, of itself, indicate that the patient suffered from mental disease, and, being a military hospital, admission is obtained by the usual transfer without certificate of any kind, and the necessary power of detention is vested in the commanding officer of the hospital by virtue of his military rank.

The struggle on the part of the Returned Soldiers for special treatment was fought out during 1917-19. It belongs more suitably to the next chapter. But it is proper to record here and now, that from this struggle there came a general recognition of the fact that the treatment of the insane was not in every State in accord with the high standard required in Australia for other branches of medicine, and that (as had been urged by the *Medical Journal of Australia* in August of 1914) it was time for an advance. The Returned Soldiers compelled this

standard for their comrades; and the insane throughout Australia benefited.

With reference to "neurasthenic" patients—that is practically all those cases that would not, if civilians, be certifiable as insane, the conference decided:

(1) That "boat leave" for such men should be deferred; they should be sent direct from ship to military hospital for observation and treatment and boat leave determined by the O.C. hospital on the advice of the S.M.O.

(2) Shell-shock, definitely neurasthenic, borderland mental, and curable inebriate cases should be retained under control of the S.M.O. of their hospital as long as considered necessary, and not discharged as a routine matter after six months (which was the alternative discussed).

(3) Such patients as epileptics and incurable inebriates should not be retained in military hospitals but might come within range of the Repatriation Department.

(4) Neurasthenics "of the debilitated heart type or thyrotoxic type" should if they wished be retained (as was the practice) for treatment in military hospitals after discharge.

(5) Patients with pulmonary tuberculosis should be retained in military hospitals longer than six months.

(6) In Victoria neurasthenic patients should be sent to special wards in No. 16 A.G.H., Macleod, and carefully segregated according to the types and degrees of neurasthenia. Cases of certifiable neurasthenia were to be kept away from contact with those of certifiable lunacy.

(7) Prolonged leave should be granted at the discretion of the S.M.O. as part of the plan of treatment.

(8) Special training or qualifications were necessary for nursing "borderland" or severe prolonged shell-shock cases.

(9) Vocational training treatment should form an important part of treatment of neurasthenic patients and out-of-door employment had special value.

Colonel Sinclair said

Neurasthenic patients require treatment, other than can be obtained in any General Hospital. I think the "neurasthenic" patients and mental cases should be taken care of. In a great many neurasthenic patients, mental symptoms are to be found. Functional neurasthenia cannot be treated in the General Hospital, it requires to be taken away from the sick, and sent to an institution where specialists are accustomed to deal with such cases. I do not suggest for one moment that only those connected with mental hospitals are able to deal with such cases, because such is not the case, but the same kind of treatment for the neurasthenic is used for the mental cases, and the same type of nursing. That they should accept as a general principle for adopting and building a hospital, separate from a General Hospital, on the lines of a mental hospital, embracing curative treatment, an institution where neurasthenic patients can be kept, out of the way.

In New South Wales they have a hospital where neurasthenic and shell-shock patients only are kept. They all enter the centre of the hospital and are classified there. They keep all the grounds in order. All the treatment is being directed under the curative system. The work of the day is divided into—part for play, part for work, etc., and the result is exceedingly good. The majority of the patients have recovered in a way that patients that go through a General Hospital do not.³²

Colonel Jones said:

[Apart from neurasthenic injury and mental cases] I have seen such a lot of men in rest homes and other institutions connected with returned soldiers whose condition is abnormal and it is to these I think we should direct our inquiries. I think the majority are released much too early from duty. I should like to see them kept longer under discipline, stricter but mixed with kindness. There seems to be a great number—men who have mild disorders and also epilepsy—unable to resist the temptation of alcohol. We have tried to make arrangements for the epileptics to go to epileptic colonies, but they refuse. I have endeavoured to get quite a large number of men from the rest homes positions, but they have not been able to stick to their jobs. I cannot help saying that a large number of these men were irresponsible and we should not have discharged them.³³

Colonel Stawell entirely agreed with Colonel Sinclair that a hospital should be set aside for neurasthenic patients, and that there should be careful classification and segregation. Men should not be automatically discharged at the end of six months.

Colonel Anderson was of opinion that the inebriates were the "worst cases"; they constantly broke leave.

Major Sewell said that the policy of discharge after six months was responsible for men constantly coming back again three years later "as bad as when they were discharged. They have been a burden on the State and I think it is our fault."

"ORTHOPAEDIC TREATMENT"

In Great Britain at the end of the first year of war the attention of the War Office was drawn by Dr. Robert Jones to the fact that

³² Col. Sinclair added: "There are about 40,000 neurasthenic patients in England who would not do a stroke of work owing to misguided sympathy. A friend of mine started a small hospital in England with 50 of his worst cases, and made a great success of it. In Canada, they first decided to discharge their patients, and they found out that the discharged soldier would not submit himself to treatment, whereas, if he were kept in the Army he could be kept until properly cured."

³³ Col. Jones added that the best treatment of such men that he had seen was at Royal Park but the chronic mental cases there should be removed.

men were discharged from the Army and from hospital as soon as their wounds were healed and their general condition allowed them to leave but they were not cured of their physical disabilities. Consequently, the civilian population was steadily becoming more and more burdened with wounded men not fit to earn their living, and not likely to become fit until they had some further surgical treatment. . . . This was a state of affairs which presented grave dangers from the economic standpoint. . . . There was no Pensions Ministry at this time to supplement treatment.³⁴

In March 1916 the task of organising this branch of surgical treatment and military procedure was entrusted to this great surgeon. The result is impressively displayed in an order by the A.G., B.E.F., on 29th January 1917 which instructed that all "orthopaedic cases" should be marked on the ship label "for orthopaedic hospital". On arrival in England they were distributed to one or other of eleven special military orthopaedic hospitals throughout Great Britain.³⁵

Sir Robert Jones has stated that, of the men treated in these centres during the war, 75 per cent. were returned to the army.

Australian soldiers went with other British casualties from the B.E.F. to these units, and received all the benefits they conferred—with one important exception, namely, that they were subject to the "six months' policy". In a large proportion of cases this involved their transfer to the Australian Auxiliaries at a stage when reparative treatment or replacement was pending. There they were boarded and thus they joined the stream of invalids for Australia that resulted from the policy.

This policy was determined by Australia in April, 1916; but it was not until the middle of 1918 that the Defence Department took in hand a comprehensive procedure for treatment of invalids on the lines undertaken by Great Britain in 1916.

Three kinds of orthopaedic intervention were required: (a) the provision of artificial limbs; (b) surgical intervention and physio-therapy; (c) curative and vocational training.

The proposal of General Fetherston—that responsibility for

³⁴ "An Address on the Orthopaedic Outlook in Military Surgery" by Col. Sir Robert Jones, C.B., Ch.M. in the *British Medical Journal*, 12 Jan. 1918, pp. 41-2

³⁵ Canadian patients went to their special orthopaedic hospital at Ramsgate.

the after-care of men finally discharged from military hospitals in Australia, should be accepted as a civil, and not a military responsibility has been recorded in *Volume I*. The proposal covered the fitting of the "limbless" soldier with a suitable artificial limb to be supplied by the limb-makers in the various States, the cost of the first limb being defrayed by the Department of Defence.

The limbless I think (he wrote) private enterprise will come in and provide homes for training cripples. Do not propose to make any artificial limbs yet.

The matter was accordingly taken in hand by the Federal Parliamentary War Committee,³⁶ which was the earliest machinery for the re-instatement of the ex-soldiers in civil life, and which worked through the State "War Councils" and their medical associates. A wholly unsatisfactory procedure developed whereby the limb-maker and not the surgeon became the arbiter of the type and fitting of the limb. The medical profession in effect handed the limbless soldier over to lay control. In England, as the result of experience gained in the South African War, there had been established at Roehampton a special Auxiliary Hospital for limbless men, where they were cared for and kept occupied while every endeavour was made to fit the stump as soon as possible for the adaptation of an artificial limb. General Fetherston, who visited this auxiliary in 1915, was much struck by the system and instructed Colonels Dunhill and Syme to make a special study of the problem. During that year Australians who had lost a limb went both to Australia and to England, where Roehampton was open to them, a grant of £600 being made to its funds through the High Commissioner.

It will, however, be recalled that special surgeons, Colonels MacCormick and Syme, who were asked to report as to the cases suitable for transfer to Australia, recommended to the D.G.M.S.—then in England—that patients with amputation stumps should be repatriated for treatment and fitting.

In the meantime the Deputy Director-General in Australia,

³⁶ Both pensioning and reinstatement in civil life were originally regarded in Australia as responsibilities of the Patriotic Funds—see *Vol. XI, Australian Official History*, pp. 828-838, and 699. The original task of the Federal Parliamentary War Committee was recruiting and keeping an eye on the welfare of soldiers in camps of training.

Colonel A. E. Shepherd, had been faced with the Gallipoli limless, who were estimated at 4 per cent. of all men wounded there. Colonel Shepherd recommended the establishment of a "Commonwealth Limb Factory" in conjunction with a Central Auxiliary Hospital in Melbourne where all necessary construction, education, treatment and exercises could be carried out. This sound advice unfortunately was over-ridden. The policy of voluntary action had been firmly fixed, and on the recommendation of the Secretary for Defence it was decided that the Federal Parliamentary War Committee undertake the whole of the arrangements for providing artificial limbs and eyes in co-operation with associated State organisations. In November the Minister for Defence recommended that the State War Councils be urged to approach various committees and trustees of patriotic funds to ask that part of such funds be allocated to the State War Council for the purpose. On his return from abroad General Fetherston enquired through the P.M.O's as to the situation in each district. Colonels Syme and Dunhill, who had returned from oversea, strongly advised a central factory and auxiliary. They reported that:

It is of the greatest advantage to have the men collected together, and under expert surgical observation while being fitted for artificial limbs. The stumps require to be carefully inspected by experienced surgeons to see that they are in a fit condition for an artificial limb, and prepared by exercises, massage, and often by operation, for the limb. Collaboration is necessary between the surgeon and maker while the limb is in process of making, so that defects may be corrected before the limb is finally finished and no limb should be passed and paid for before the surgeon is satisfied that it is suitable. They suggested that a special ward be set aside in one of the base hospitals for patients who have had limbs amputated, and it would be an advantage if workshops were provided there also, where some of the work of making and altering the artificial limbs could be carried out.

The matter was permitted to drag on. In July 1916 a conference was called by the Minister and attended by General Fetherston, the Hon. J. C. Watson (then Honorary Organiser of Repatriation) and Colonels Syme, Dunhill, MacCormick, and Honman. They strongly commended the proposal of a central factory.

General Fetherston protested to the Minister that when, on his return, he asked about "the Department's factory (I) was

told that the War Committee had . . . insisted that local manufacturers should do the work”.

A further conference was held, and on 14th August 1916 the Minister approved the establishment of a factory at the Caulfield Hospital. The first issue of surgical apparatus was to be undertaken by the Defence Department, later ones would be made by the State War Councils.

At the beginning of 1917, on the instance of the Hon. J. C. Watson, the Australian Government negotiated with an American firm to provide an expert and make available the patent for a type of limb which at this time was much in vogue, and a Mr. Aunger was engaged at a salary of £1,440. Under his supervision the manufacture of limbs in Australia was proceeded with. In March 1917 the D.M.S., A.I.F. was informed that the factory at Caulfield was working and that both arms and legs could be fitted in Australia.

In the meantime in 1916 in England, in the absence of action in Australia, No. 2 Auxiliary had been established, working in conjunction with Roehampton. The pressure on this unit, and the accumulation of limbless Australians in England, waiting with nothing to do, was found most detrimental to the interests of all concerned and General Howse was insistent that the supply in Australia should be expedited. In June 1917 he wrote to General Fetherston:

Am sending you by hospital ship a certain number of unfitted legless men [the first batch]. Shall be glad when you are able to deal with all limbless, as they take such a long time getting ready to be fitted. Possibly you will be able to send me a cable when you are ready for more legless, specifying number and States when you cable, and they will be sent by first hospital ship available.

On 24th August 1917 he wrote:

Legs [i.e. leg cases] are being sent—will send double number early in September, as it will be eight weeks since any unfitted limbless (legs) left England. Sending arm cases has made it much easier for us.

Thereafter, with vicissitudes partly owing to lack of timber, the manufacture of limbs in Australia gradually supplanted their manufacture overseas so far as the A.I.F. was concerned. Factories were opened in all the State capitals and the vital task of “training cripples” and other sufferers from war injuries

was taken in hand systematically, with effective co-operation between the Defence Department and the machinery for civil re-instatement which gradually replaced the voluntary bodies. The appended table shows the progress of fitting limbs in Australia by the end of June 1918.

The further history of the workshops belongs to that of the Repatriation Commission.

ARTIFICIAL LIMBS—SUPPLIED AND AWAITED
at the end of June, 1918.

Military District	Amputation cases arrived since beginning of War		Not yet finalised		Limbs supplied (from all sources)	
	Arms	Legs	Arms	Legs	Arms	Legs
1. (Q'ld.) ..	65	133	36	39	29	95
2. (N.S.W.)	197	401	95	158	102	243
3. (Vic.) ..	199	383	55	222	144	161
4. (S.A.) ..	37	117	19	61	18	56
5. (W.A.) ..	62	102	44	72	18	30
6. (Tas.) ..	24	28	6	7	18	21
Totals ..	584	1,165	255	559	329	606
Arms and legs ..	1,749		814		935	

In the *Medical Journal of Australia*, 8th January 1916, there appeared a letter by a correspondent, "Aviator", under the heading *Orthopaedics and the War*, strongly appealing for specialisation in the treatment of "men who have suffered from gunshot wounds of the limb bones, with accompanying lesions of muscle and nerve."³⁷ The correspondent urged expert care of these on hospital ships and in Australia.

Reparative surgery

³⁷ How early these needs were recognised in Germany is to be inferred from an article quoted on 19 Feb. 1916, by the *Medical Journal of Australia* from the *American Journal of Orthopaedic Surgery*. Under the heading of "Twelve Commandments for prevention of crippling among wounded" this article cited a set of rules which in the first months of 1915 were "placarded broadcast throughout the hospitals in Germany at the front". These rules, which are as complete and appropriate to-day as they were in 1915, impressed "the fact that . . . time, trouble, and expense will be saved by striving to ward off all disturbances in motor functioning, and by insisting on prompt orthopaedic or mechanical after-treatment if such becomes necessary." Thus—". . . (4). Shorten as much as possible the period when the joint is kept still; have it exercised as soon as possible, and change its angle frequently. Keep up the strength of the muscles menaced by the enforced repose, having massage and electricity applied early and systematically with active exercises. (5). Remember that the extensor muscles deteriorate faster than the flexors. . . . (6).

The work of Robert Jones, in England, gives us an example which, if followed, would save, over and over again, to the Commonwealth in pensions alone the cost of the personnel and equipment. Why delay longer? Why not "Do it now"?

This letter was supported by a leading article and subsequently by a letter from the Orthopaedic Surgeon, Mr. R. B. Wade.

There is no evidence of effective response to this appeal at the time by either the Department or the profession generally.⁸⁸ Two serious mistakes were made. (1) Instead of a full-time appointment of a specialist consultant for Australia, two eminent but busy surgeons, Colonels Syme and MacCormick, were appointed in a part-time advisory capacity. (2) Undue prominence was given to the exploitation of massage and "physiotherapy" as the cardinal factor in the recovery of function in every type of injury.

On 17th June 1916 the *Journal* resumed its campaign with a strong appeal, urging that "specially trained orthopaedic surgeons should be employed at the front . . ." and that "when the men could be brought back to the Commonwealth, they should find adequately-equipped orthopaedic departments in the hospitals".

. . . place the shoulder, elbow, wrist, fingers, knee and other joints in the position most favourable for their functional use later. . . . (7). Do not allow the hand to droop from its own weight when the arm is in a sling. . . . (8). Leave the fingers exposed so they can be worked freely, and warn the patient to keep them continuously working. . . . Save enough of the hand to grasp things with, if possible . . . an artificial hand is decidedly inferior to even a mutilated stump. . . . (9) Stimulate the circulation by exercising the legs and by deep breathing, even when the man is unable to be up. . . . (10). Get rid of extravasated blood by measures to promote absorption, etc., such as raising the limb, massage, heat, alternating hot and cold douches. . . . The last "commandment" warned "not to disregard the mechanical factors involved . . ."

Nothing illustrates more scathingly the deplorable state of British and Australian surgical practice in this matter than the gulf between this outlook and that prevalent in 1914 in Britain and Australia—which is reflected in the history of the treatment of Australian "crippled" soldiers.

⁸⁸ Dr. W. Kent Hughes in Victoria pressed for similar reforms. In May of the following year when he was going to an orthopaedic appointment under Sir Robert Jones, he wrote to the Minister for Defence urging "the necessity of such work here in Australia. A small beginning has been made in N.S.W. at Randwick and five men have been detailed to learn orthopaedics in England, but an orthopaedic surgeon is born not made. For 12 months I have endeavoured to get an orthopaedic institute started here and the Council of the Victorian Branch of the Medical Association has passed a resolution that such an institute is very desirable."

General Fetherston's minute on this letter accurately reflects the official attitude towards this movement and the lines on which treatment developed.

"There is an establishment for this work at No. 4 A.G.H., Randwick, and arrangements were made for suitable appliances at No. 11 A.G.H. Caulfield last October. They have taken a very long time to complete owing, I understand, to the manufacture of some articles being held up by the Moulders' strike. The best available surgeons in Australia are doing so-called orthopaedic work in our military hospitals."

Practical suggestions for action covering every stage in the "orthopaedic" history of the wounded man were made, including proposals for a central orthopaedic hospital under experts; for expert classification of cases and supervision; and for action overseas to prepare for this.

The only immediate outcome appears to have been General Howse's decision to give special facilities for training surgeons from each State in this specialty. This was done, and at the front no medical service entered more fully into the orthopaedic outlook than did the Australian, nor, it may be added was any better qualified by tradition and training to do so.³⁹

Apart from the steps taken towards equipping Australian soldiers with artificial limbs from workshops in Australia the only important action of which available records take note was the accedence by the D.G.M.S. in July 1917 to a proposal for establishing "workshops" in hospitals or convalescent homes and "various forms of amusement" in the military hospitals. Suggestions as to these needs had come from Mr. J. O. Fairfax, Chairman of the Executive of the Red Cross Society in New South Wales. General Fetherston recommended that in the workshops "minor works" could be carried out by patients, which would "allow the Repatriation authorities to endeavour to gain some idea of what work the men are suitable for". Shortly after this decision Colonel A. H. Sturdee, President of the Permanent Medical Referee Board in Victoria, sent in the following grave report:

The P.M.R.B. in the course of their work have noted with grave concern the growth of Hospitalism among the men invalided from the front for ordinary medical ailments. This growth is fostered by the length of time that necessarily elapses before the soldiers can be returned to Australia and eventually discharged.

To take some typical examples. It is no uncommon thing to find a soldier invalided from the front for pneumonia, who, after running his usual course is boarded at the expiration of three months, found unfit and recommended to return to Australia. Another 3 or 4 months go by, during which he is awaiting embarkation and then the voyage out takes two months, so that he reaches the P.M.R.B. in about 8-12

³⁹ Justification for the statement may be found by reference to the following articles by Australian officers:

Victor Hurley and H. R. G. Poate, "Notes on Military Orthopaedics", *Medical Journal of Australia*, 26 Jan. 1918, p. 61 and 2 Feb. 1918, p. 81; Balcombe Quick, "Gunshot Wounds of the Knee Joint", *Medical Journal of Australia*, 8, 15 and 23 June 1918, pp. 469, 487 and 510; Victor Hurley and S. H. Weedon, "Treatment of Cases of Fractured Femur at a Base Hospital in France", *British Journal of Surgery*, Jan. 1919, Vol. VI, p. 351.

months after his attack. During the whole of this time he is doing practically nothing, his muscles have become atonic and he is, although medically fit for industrial employment, totally unable to carry on.

If the Board were to decide to give him a full pension, the evil will only be intensified as, at the expiration of another six months' idleness, he will still be unable to resume his full occupation. We can easily point in our records to hundreds of cases of men who have been drawing full pension for 6-12 months and have done no work of any description for 18-24 months, after an attack of pleurisy or pneumonia or appendicitis or lumbago, etc.

Any effort, therefore, which would put these men into a fit state to resume their occupation would save the Commonwealth thousands of pounds in pensions. . . .

Therefore the P.M.R.B. strongly suggest the exercising of the men by physical instruction under medical supervision whilst returning to Australia. They are confident that five weeks of this training will enable them to reduce the pensions with fairness to the pensioners and with enormous saving to the Commonwealth.

The warning was taken seriously; and was soon held to apply even more exactly to surgical disabilities.

The whole matter was now taken up by the D.G.M.S. in conjunction with the Red Cross Society, the State War Councils, and the Repatriation Trustees whose Secretary, Mr. D. J. Gilbert, took a very active part in promoting the creation of workshops and the organisation of reparative and instructional training. Physio-therapy was exploited vigorously though with little intelligent oversight. Towards the end of 1917 General Fetherston desired General Howse to send back to Australia an officer, Captain Syme Johnson, who was understood to be keenly interested in massage and physical therapy.

This officer was not one of those to whom General Howse had given special opportunity to acquire experience in orthopaedic work. But at the end of 1917 several of those officers—who had also made an extended tour of the British, French and Belgian organisation for such treatment—returned to Australia. They were gravely dissatisfied with what they found, and with the opportunities afforded them for undertaking effective orthopaedic work. Colonel Hugh Poate stated:

In December, 1916, the D.M.S., A.I.F., appointed a surgeon from each State (excepting Western Australia, as there was not then a man available with the necessary qualifications) to visit the big orthopaedic centres in London and enquire into the arrangements for dealing with the disabled, maimed and crippled.

I know that three of these men have returned to the Commonwealth within the last 6 or 8 months and to the best of my belief,

no attempt whatsoever has been made by the authorities to make any use of their special knowledge and experience.

Lieut.-Colonel D. A. Cameron afterwards wrote:

The whole organisation and methods of treatment were chaotic on my arrival. I found some men, with nerve lesions and other types of injuries, that had not been examined by a medical man for 12 to 18 months. When I tried to obtain better organisation and treatment in Queensland, I regret to say I was not fully supported by the medical profession in power in military circles, and consequently, later on I refused to work under the conditions unless immediate alterations were instituted. . . . The lack of support was due partly to the fact that the essential principles of orthopaedic treatment and war surgery generally had not been grasped by those in authority, and partly because the Military did not give fuller powers, more time, and better pay to trained surgeons to work on efficient and scientific lines. I may say in passing that my pay was not sufficient to live on, and one could not possibly do outside work and efficient military hospital work at the same time.

Instead of following the course which certainly had been plainly marked by A.I.F. experience overseas and keen criticism in Australia, in February 1918 General Fetherston was sent off on a belated voyage of enquiry to the theatres of war, an important part of his mission being to investigate the methods and organisation for the repair of war-damaged soldiers. On March 16th the *Medical Journal of Australia* made scathing comment:

After more than three and a half years of war, the Director-General of Medical Services has been allowed to proceed to Europe to study the arrangements for dealing with the disabled, the maimed and the crippled. After three and a half years! Everyone knew in August 1914 that each of the belligerent countries would have sooner or later to face the problem of endeavouring to restore a large number of men to useful life, and to limit the number of derelicts to a minimum. Apparently Australia has elected to do this later. In season and out of season during the greater part of the three and a half years, we have urged the institution of a properly equipped orthopaedic service and a properly adjusted neurological system. The object of these two organisations would have been to place our soldiers as soon as possible after the reception of their wounds or after other deteriorating influences had produced their baneful results, in the most favourable position for complete physical and mental restoration. The necessity for early and well-planned orthopaedic and neurological work has been emphasised by many highly trained medical officers on their return to the Commonwealth. But up to the present there has been no serious attempt to create a proper service, which would offer our soldiers the best chances for a profitable and useful life after the war.

Colonel Poate's letter, quoted above, and others followed.

Then "things began to move". Overseas from the middle of 1917 steps had been taken to ensure that the effect of the break in treatment between the hospitals in England and in Australia was not more serious than could be avoided. At the beginning of April 1918 Lieut.-Colonel Honman was instructed by the Minister to proceed overseas "to enquire into and report on orthopaedic work" with particular reference to the complaints against the procedure in England. His report entirely exonerated the overseas service, which, he found, had evolved a well considered plan of dealing with this class of case not only in England, but for the continuance of any treatment required on board the transport.

He urged that General Howse be allowed to select some of the younger medical officers to be trained for three months at the great orthopaedic centres overseas and then seconded to Australia to work under senior general surgeons—the method recommended by Sir Robert Jones.

Meanwhile, however, owing to the outspoken criticism in Australia, in April the Deputy D.G.M.S., General Cuscaden, took the decisive step of calling a conference of the most important administrators, surgeons concerned, and representatives from all the Military Districts to "consider and advise upon the whole question of Military Orthopaedics".⁴⁰

The discussion was candid and comprehensive.⁴¹ The result was the decision to appoint a full-time director of orthopaedics for Australia, on the lines carried out in England early in 1916 and in France and Germany at a still earlier date. In July Colonel Wade who had held the position in charge of the orthopaedic department at No. 4 Australian General Hospital, Randwick, since 18 July 1915, was appointed Consulting Orthopaedic Specialist.

⁴⁰ The Central Administration was represented by Surg.-Gen. Cuscaden, D.D.G.M.S., who presided, Lieut.-Col. Thwaites, Staff Officer for Medical Services, and Mr. Aunger, Manager of the Commonwealth Artificial Limb Factories; the 1st M.D. by Lieut.-Col. Cameron, 2nd M.D. by Col. Sir A. MacCormick; 3rd M.D. by Col. Syme, and 4th M.D. by Lieut.-Col. Cudmore. The following also took part: Majors Kater and Wade from 2nd M.D.; Col. Sturdee, Lieut.-Col. Stanley Argyle, Maj. Murray and Capt. Syme Johnson from 3rd M.D., Captain Hadley from 5th M.D.

⁴¹ Capt. Syme Johnson, who attended, bitterly attacked the whole system involved in the "six months' policy" as interpreted by Gen. Howse. Failing complete reorganisation of the whole system overseas he desired a fully organised and trained service of massage—on which he appears to have placed extreme and quite inordinate importance.

In England, General Howse instructed the A.D.M.S. of the A.I.F. depots there, Colonel McWhae, to examine the problem of "the treatment and after-care of disabled soldiers". McWhae, reporting in August, proposed, as an alternative to the existing system, that a complete orthopaedic hospital be organised in Great Britain to receive all patients of this kind and carry treatment to the stage of the final procedure, whether of reparative training or of an extensive orthopaedic campaign such as might be involved in the repair of function. As a third possible course he suggested a very great extension of the system in No. 2 Command Depot with a full medical staff and an elaborate system of physical therapy.

It is clear that he did not himself favour any fundamental change in the existing policy, but only a more exact co-ordination of the treatment in the Australian Auxiliaries and that provided on the voyage.

It seems probable that had the war continued beyond 1918 some scheme for definite treatment in England would have been adopted. With the Armistice however in November of 1918 any such necessity passed.

After the appointment of Colonel Wade, orthopaedic treatment of A.I.F. invalids in Australia progressed steadily but slowly to an effective system which, taken over by the Repatriation Department, becomes part of the matter of the next chapter. When all is said the root cause of the orthopaedic muddle lay in the fact that the medical profession in Australia as a whole did not understand the subject, and that adequate provision was not made to ensure that practice and procedure in the military hospitals were controlled by those who did.

The initial mistake lay in the failure of the Director-General to undertake the responsibility in 1915 for organising this service—and others—on a Federal instead of a State basis. This was largely due, no doubt, to unwillingness to spend money in Australia. To maintain a permanent medical staff would have involved high expense nor would it have been easy to retain the best men from overseas. Even with high rank such men were at a grave financial disadvantage when compared with those who had stayed at home in civil practice, doing perhaps part-time work among soldiers, but earning in

some cases five or six times the full military surgeon's pay. There was a strong tendency, therefore, to rely upon part-time and semi-voluntary work. It is not open to question that part-time service of a high quality and great devotion was given by the civil profession to the returned soldiers. But the system was entirely inadequate; had the true need been recognised by the medical profession as a whole, no doubt the money for a more adequate system would have been found.

THE EXCLUSION OF EXOTIC DISEASE

The exclusion of disease that might enter Australia from abroad was the responsibility of the Federal Government, and was carried out through its Director-General of Quarantine, Lieut.-Colonel J. H. L. Cumpston. The list of diseases coming within the scope of the quarantine restrictions was determined by Federal regulations implemented by international co-operation.⁴² Quarantinable diseases such as smallpox, plague, cholera, and so forth, when once admitted, became a responsibility of the State authorities who controlled the internal "Public Health". They also regulated entirely the "notification" of diseases in each State.⁴³

But with the returning soldiers there immigrated into Australia a number of organisms that were not prohibited by the quarantine regulations. Reciprocal action between Defence Department and States was deemed necessary to protect the civil community against dysentery, especially the amoebic form; malaria; bilharziasis; tuberculosis; trachoma; and venereal disease.

Venereal Disease. The "hush hush" attitude toward these diseases had created an excessive fear-complex which was reflected in apprehension as to "the pollution of the race" by the returning soldiers and led to a not very successful attempt at a rigid exclusion. Tragedies certainly there were; but it is doubtful whether the A.I.F. was more infective than the Australian community. Venereal disease was, however, notifiable

⁴² The international action centred in the Office International d'Hygiène Publique in Paris.

⁴³ Control of notifiable disease in camps was mutually arranged between the R.M.O's and the State Health Authorities, but the Army assumed responsibility for the measures against indigenous disease in camps, which have been dealt with in Vol. I, Chap. xxiv.

in most States and the segregation of A.I.F. cases was justified.

Amoebic Dysentery. The pathogeny of this curious disease did not permit or necessitate strict oversight, though it is certain that a considerable number of "carriers" of dysentery came in as invalids or otherwise. The disease was made notifiable by the States. A few local outbreaks were attributed to the A.I.F. The same can be said of the infective groups of *Bacillary Dysentery*, which did not come up to the apprehensions.

Vincent's Disease. No exact steps were, or perhaps could be, taken to prevent the diffusion of this condition and there is general agreement that it was widely diffused through the returning soldiers.

Trachoma was, and remains, one of the unsolved enigmas of medicine. Its epidemiological history is perhaps the most extraordinary in the history of medicine. Influenced by the traditions of the Napoleonic Wars the French delegation at the Interallied Conference regarded it with the gravest concern. For many years it was the greatest drawback to life in the backblocks in Australia. But neither abroad nor in its return to Australia was the A.I.F. materially affected by it.

Malaria. All the Australian forces overseas—the R.A.N., the A.N. and M.E.F. to New Guinea, and the A.I.F.—were subject to intensive assault by the malarial parasites;⁴⁴ a large number of men were invalided for the disease and even more afterwards suffered from relapses or pseudo-relapses. For several strong reasons the Australian Government was concerned to ensure that these men should be cured promptly and completely. The patients were therefore dealt with on a compulsory basis. Conveniently at Townsville in Queensland there had been formed—an implement in the "White Australia" policy—an Institute of Tropical Medicine, under a distinguished parasitologist, Dr. Anton Breinl. During the war all malarial cases from every State except Western Australia were sent here for treatment and an exact and effective therapeutic and diagnostic technique was worked out.

After the war, by agreement between the Ministers, the

⁴⁴ See Vol. I, pp. 605, 705 et seq., 737, 746.

newly created Federal Department of Health took over the responsibility in connection with both this disease and bilharziasis. During 1919-21 some 1,100 cases of malaria were treated; and in the same period 150 recurrences were reported to the Repatriation Commission.

That no threat of serious endemicity has arisen Australia owes to the "White Australia" policy.

Bilharziasis. Australia has been very closely interested in this, perhaps the most picturesque and astonishing of all diseases. The parasitic form, of which man is the definitive (sexual) host emigrated to Australia in considerable numbers in the portal veins of soldiers returning from the South African War. They found, surprisingly enough an acceptable intermediate (asexual) snail host awaiting them, and were able to establish at least one and probably more endemic centres. They failed, however, so far as can be ascertained, to establish any new colonies—though this was not due to any special preventive steps—and the subject only came within the cognisance of the Australian medical profession and public when in the first World War the worm began to infect the troops in Egypt and protective measures became a subject of disciplinary regulations, the nature of which has already been described.⁴⁵ During the war of 1914-18 some 157 members of the A.I.F. became hosts of the worm and brought it with them on their return.

Until 1917 there was no effective treatment for or means of preventing this disease, which under favourable conditions may assume widespread endemicity and become only less detrimental to health than malaria. And since the invalids could not be indefinitely retained in the Army they had been discharged while still infective and had become widely scattered throughout the Commonwealth—a potential and immediate menace.

A therapia sterilisans; tartar emetic. The position was radically changed by a discovery which has been referred to by Professor Carmichael Low⁴⁶ as "perhaps one of the most brilliant discoveries in tropical medicine".

⁴⁵ Vol. I, p. 51.

⁴⁶ Introductory address to the Section of Tropical Diseases British Medical Association combined meeting Melbourne 1935. *British Medical Journal*, 19 Oct. 1935

In the second decade of this century two Belgian doctors working in the Congo in an attempt to discover a radical cure for sleeping sickness on the lines of "606" found this drug useless. The allied metal antimony suggested itself. Given by the mouth antimony tartrate (tartar emetic) causes violent vomiting and purging and is in fact a virulent poison.

As an experiment they gave some natives who were in *extremis* a little of the solution of the drug (directly) into the veins. The result was extraordinary. . . . Larger doses were tried and the intravenous route established.

In 1917 Christopherson tried the same treatment in vesical and rectal bilharziasis at the Khartoum Civil Hospital with a success as dramatic.

The whole outlook individual and social for the worm and for its victims was changed. For Australia the course of events is described as follows by the Director-General of Health.⁴⁷

The earliest case recorded in Australia was a case exhibited at Adelaide in 1892, who had been infected in South Africa. No other case was recorded until after the return of Australian troops from the South African war. The recorded cases were:

- 1901—A case in Queensland—a returned soldier.
- 1904—A case in Sydney—a returned soldier.
- 1905—A case in Sydney—a returned soldier.
- 1906—A case in Sydney—a returned soldier.
- 1907—A case at Newcastle, N.S.W., possibly locally infected.
- 1909—A case in Sydney—a returned soldier.
- 1910—A case in Sydney—possibly locally infected.

In 1912, a small focus of bilharziasis was discovered at Greenbushes, Western Australia. A soldier, returned from the South African War, and known to be suffering from bilharziasis, settled at Greenbushes in 1908. In 1912, two cases, with a doubtful third case, were discovered at this settlement.

It is possible that other cases in Australia were missed, but it is clear that this disease did not assume primary importance until the commencement of the Great War in 1914. During the period when the Australian Expeditionary Force was camped in Egypt, many men were infected by bilharzia parasite. There was, at that time, no effective treatment for this disease, and, since these invalids could not be indefinitely retained in the Army, they had, on return to Australia, been discharged although still in an infective condition; and they had become widely scattered throughout the Commonwealth. The Commonwealth Department of Health was charged with the public health control of the problem thus presented. With the assistance of the

⁴⁷ In *Health and Disease in Australia*, 1 Jan. 1918, by Dr. J. H. L. Cumpston.

Defence and Repatriation Departments, steps were taken to trace these men and to secure their attendance at the nearest convenient centre for examination and treatment. In the great majority of cases it was found that active infection still persisted. A full course of antimony potassium tartrate by intravenous injection was given over several weeks until the patient was no longer infective, the total amount given, in most cases, reaching thirty grains. The patients were then discharged, but were required to report periodically for examination to determine whether they were still infective. Efforts were made as far as possible to find employment for the men in sewerage city areas.

The treatment by intravenous injection of antimony potassium tartrate proved very successful, and in the great majority of cases no recurrence occurred after treatment, within the period of three years during which the patients were kept under observation. In the few instances in which activity of the disease was again shown, a further course of tartar emetic treatment was given with satisfactory results. In 1923 and 1924, from two to three years after treatment, 81 per cent. of the treated men reported for final observation, and in only four per cent. of these did any evidence of infection still persist. This took the form of periodical attacks of pain and haematuria; but no ova were detected in the urine or faeces.

The actual figures of bilharziasis cases investigated and treated in Australia were as follows:

Total persons dealt with as possible cases	157
Total persons examined with diagnosis confirmed as bilharziasis in Australia	110
Total cases examined with diagnosis of bilharziasis excluded in Australia	23
Total cases in which a diagnosis of bilharziasis was made in Egypt, which on examination in Australia were found to be no longer infective	11
Cases diagnosed as bilharziasis in Egypt which refused examination or treatment after discharge in Australia	3
Cases not traced in Australia	3
Deceased	5
Previously left Australia for overseas	2
Total	157

Of the 110 men whose diagnosis was confirmed in Australia, 108 were treated and 2 refused treatment. In all, therefore, eight men remain untreated, of whom five refused treatment and three were untraced.

No instance has since occurred of any local spread of bilharzia infection in Australia from any soldier infected abroad; and it may be concluded from the above observations that the control of the disease, by the measures adopted, was successful.⁴⁸

⁴⁸ Bilharziasis was made notifiable in Victoria (1920), in Queensland (1917), in South Australia (1917), Western Australia (1912), and in Tasmania (1917). Haematuria was made notifiable in Queensland (1920), in Western Australia (1917), and in Tasmania (1917). In Western Australia the notification of bilharzia was annulled in 1921.

Major M. J. Holmes, senior medical officer, Commonwealth Department of Health,

The story of the protection of Australia against the second and deadlier wave of the influenza pandemic is one of national and professional importance. The "second wave" was due to reach Australia—and did in fact reach her nearest neighbours—during the first stage of the repatriation of the A.I.F. Hitherto no serious attempt had been made in any country to check the invader—its march was exactly as rapid as man could travel.

But upon news of its arrival in Capetown and New Zealand the Australian Director-General of Quarantine made a decision which stands out as one of the most enterprising and courageous in the history of international quarantine. It was no less than an attempt to stay the disease by declaring it an "enemy" within the meaning of the Australian Quarantine Act; and this at a moment when the inconveniences, restrictions, and even dangers arising from quarantine measures enforced would fall most heavily on the soldiers returning from the war!

The approaching pandemic wave was distinct from an outbreak in Australia of a pneumonic disease which was being called "influenza". During the first half of 1918 the outgoing troopships had been singularly free from pneumonic disease; but, says Colonel James,⁴⁹

1. The episode of the seven troopships

there was an unusual prevalence of influenza in various parts of Australia

noted, 8 July 1930: "Since no powers existed under which the men could be compelled to undergo examination or treatment steps were taken to induce them to report to the Repatriation Hospital in the capital city of their State for examination. All expenses, including travelling expenses were defrayed by the Government, and in addition a full pension was paid to the men during their detention in hospital for examination and treatment. The response was very satisfactory. More than 95 per cent. of all men who had returned to Australia with a history of having contracted bilharziasis reported to hospital as required."

⁴⁹ The authorities on which this note is based are—(1) *Influenza and Maritime Quarantine in Australia* by Dr. J. H. L. Cumpston, (Service Publication No. 18, Melbourne, 1919)—a piece of work which has been accepted generally as of outstanding merit and of great importance. Its most important feature, beside the exact record of the experiment, is the study of local ship epidemics, a subject which as pointed out by Dr. Cumpston presents unique opportunity for the study of, so to speak, "potted epidemics".

(2) *Reports on Public Health and Medical Subjects No. 4*—Report on the Pandemic of Influenza, 1918-19, prepared under the direction and issued by Sir George Newman (Ministry of Health) (London—H.M.S.O. 1920). (Chapter II of this report deals with "The General Statistics of Influenza in Australasia and Parts of Africa and Asia" and was written by Lieut.-Col. S. P. James.)

(3) *Health Problems of the Empire, Past, Present and Future* by Andrew Balfour and Henry Harold Scott (London: W. Collins Sons & Co. Ltd.).

(4) *Report of the Director-General of Public Health, New South Wales for the year 1919*, including a report on the Influenza Epidemic, 1919 (Sydney: Govt. Printer).

(5) Voyage reports of the H.M.A. Transports.

during 1918, before there was any risk of epidemic infection from other countries. The statistics show that the local type of influenza began in July and continued in a quietly progressive form during October, November and December. It is stated, however, "as an established fact" that, whatever influenza incidence obtained during those months, the disease was not to be considered as in any way comparable epidemiologically with the disastrous pandemic form. . .

The camps of training were involved in this earlier widespread "outbreak".

In August-September of 1918 the wave of virulent influenza reached South Africa from Europe and spread widely.

During the months of September, October and November seven troopships left Australia with troops for the A.I.F.—five went via the Cape of Good Hope, one via Panama and one via Suez. Their history is shown in the table on the next page.

The experience seemed to support the idea that whatever its causal factors the "second wave" was clinically and epidemiologically specific.

2. The campaign

The director of quarantine was in close touch with events in South Africa through the Health Officer, Dr. J. Alexander Mitchell. The conditions in Australia and reports from Dr. Mitchell decided Dr. Cumpston that it was his duty to recommend to his Minister that an attempt be made to exclude the virulent disease.⁵⁰

In the judicial and properly guarded report of the British Ministry of Health, Dr. James says:

Two subjects are of outstanding interest in the history of epidemic influenza in Australia; it was the only country which attempted to secure immunity by establishing the principles of maritime and land quarantine in a strict manner, and it was the only country which escaped, for at least some months, the terrifying type of influenza which, from October to November 1918, raged elsewhere almost throughout the world.

After recording the existence of the "local" epidemic, the evidence of which was provided by the history of the voyage of the transport *Borda* which left Sydney on 18th July 1918, Dr. James continues:

By September 1918 the outbreak of what was regarded as the local type of influenza in Sydney had become very extensive. . . . In

⁵⁰ For a detailed account of the experiment the reader is referred to Dr. Cumpston's Report.

Left Australia	Ship	Route	Remarks •	Shore Leave	Health History
1. September	<i>Port Darwin</i>	<i>via Suez</i>		None	Health good
2. "	<i>Barambah</i>	<i>via The Cape</i>		Durban	16 deaths from pneumonic influenza followed
3. "	<i>Bakara</i>	" "		Durban	28 deaths followed.
4. October	<i>Zealandia</i>	" "		None	Health good
5. "	<i>Wyreema</i>	" "	Recalled owing to Armistice	None	Health good
6. November	<i>Boonah</i>	" "	Recalled owing to Armistice	Durban	24 deaths on return voyage
7. "	<i>Medic</i>	<i>via Panama</i>	Recalled owing to Armistice	Wellington, N.Z. (on return voyage)	12 deaths after leaving Wellington

the hospital at Melbourne in November there were about 30 cases of a form of influenza "sufficiently severe in type to excite comment".

These occurrences were known, but it was held that they represented nothing which could be likened in any way to the extraordinarily severe type of influenza which attacked South Africa and New Zealand.

The application of maritime quarantine from the 17th of October 1918 was an endeavour to prevent the entry of that type of influenza. During the seven months from October 1918 to April 1919 the quarantine service dealt with 149 uninfected vessels and 174 infected vessels, with a total personnel of 81,510 including 1,102 actual patients. In some of the vessels detained in quarantine serious epidemics of the pandemic type of influenza occurred, but it is definitely stated that no evidence was at any time obtained of an escape of infection by a demonstrable chain from these persons or ships in quarantine to the shore population. For this and other reasons it was concluded that from October to December the measures of maritime quarantine which were taken had the effect of holding at the sea frontiers an intensely virulent and infective form of influenza which during those months was causing disastrous epidemics in New Zealand and South Africa.

The first cases recognised as characteristic of the virulent type of influenza occurred almost unrecognised in Melbourne during January 1919. By the 20th of that month some fifty cases had been recorded "which appeared from the accounts received to resemble the severe form of influenza". Immediately following these cases epidemics developed in Victoria and subsequently throughout the States of Australia, the peak of the outbreak rising in accord with the introduction of the disease from outside. Local (internal) isolation appeared to have no influence whatsoever on its course and extension.

There was much criticism among returned soldiers of the steps taken and ultimately an increase in the morbidity and mortality rates was experienced sufficient to determine a definite influence on the curves of all the prevailing causes of death. But it was clinically and epidemiologically *a very greatly attenuated reflection of the wave which passed over all of Australia's neighbours.*

The following comment by Sir Andrew Balfour seems not unduly appreciative of the experiment.⁵¹

In future we should be on our guard and every effort should

⁵¹ A suggestion by the Director-General of Health in the State of New South Wales that the "local" epidemic was in fact the "first wave", which it was presumed may have reached Australia in October opens up another interesting view of the nature of the influenza outbreaks in Australia.

be made to prevent the introduction of sea-borne influenza. That this is a task worth attempting is shown by what happened in Australia, where it is claimed that escape from the devastating forms of the disease—an escape in marked contrast to what happened in, say, Sierra Leone, South Africa, and New Zealand—was due to the result of work of the Commonwealth Quarantine Service (possibly the most advanced and efficient in the world), and was attained by the holding in quarantine of every infected vessel during the six months of danger.

Anxiety as to this and other health problems likely to be associated with the return of Australian troops from overseas was the motive that induced the Federal Government in 1919 to establish on the suggestion of Dr. Cumpston⁵² a Federal Health Department “to inspire and co-ordinate Public Health measures generally without infringement or transfer of the sovereign powers of the States”. The States agreed especially in view of the need for leading and co-ordinating research. Under its control, besides quarantine and the Australian Institute of Tropical Medicine, came the Commonwealth Serum Laboratories. The laboratories were themselves a very important outcome of the First World War. The following account of their institution is authoritative:

Towards the end of 1914, it became apparent that supplies of biological products especially diphtheria and tetanus anti-toxins, would be available in Australia only in limited quantities, if at all. The war situation had produced such demands on European and American supplies for British and French use that Australia was in danger of being left without any. Accordingly, after consultation with one or two people interested, Dr. Cumpston recommended to the Minister that the Government itself should immediately set about production so that it should never be caught in the same position again. This was agreed to and Dr. Cumpston was given a fairly free hand as to expenditure and staff. The building was opened for work while the war was still in progress; the first contribution on any large scale was the preparation of large quantities of influenza vaccine to meet the epidemic of 1918-19. The development of these laboratories proceeded with many initial difficulties, but with such ultimate success until, during the Second World War, they have supplied not only all Australia's own requirements, both for the services and for civil needs, and for troops abroad as well as at home, but also most of the needs of the Government of New Zealand, Hong Kong, Malaya, Dutch East Indies and India.

Up to the end of June 1916 the number of A.I.F. returned

⁵² In 1921 after arrangement with the International Health Board a Ministry of Health was established.

to Australia had been 17,190. During the following years the numbers were—1st July 1916 to 30th June 1917, 12,833; to 30th June 1918, 40,441; to 30th June 1919, 106,735; and thereafter 87,274.

The total was made up as follows:

Sick	71,048
Wounded	31,375
Venereal	1,474
Demobilisation	129,804
Furlough	8,912
Medical Studies	41
Over age	1,349
Under age	361
On duty	15,569
Other reasons	4,440
	<hr/>
	264,373

In March 1920 the question of control and management of the military hospitals in Australia came up for discussion, and in June a conference was held between representatives of the Defence Department and the Repatriation Commission, at which it was decided to terminate the military service of all men who had been back in Australia for three months or more, as from 1st July 1920, and to end the service of future returnees at the expiration of three months after arrival. Those not fit were granted pension, further treatment being arranged by the Repatriation Commission. In October 1920 at a conference between the Minister for Defence and the Minister for Repatriation it was agreed that the Australian Imperial Force in Australia should cease to exist on 31st March 1921. After January 1921 all ex-A.I.F. patients became the responsibility of the Repatriation Commission.

At this stage the invalid soldier passes from the Department of Defence and from the Army to the Department of Repatriation and to civil life. And just as the first responsibility of the Army Medical Service was to assess his fitness for service so its last was to ascertain the damage he had sustained in the course of that service. Every soldier before his discharge was "boarded" and therein was given an opportunity to "declare" any injury or disability sustained by him.

CHAPTER XVI

THE WAR-DAMAGED SOLDIER

THE Australian system of war pensioning has its roots in the British. The British system, excluding the purely personal arrangements made by feudal lords, began in the reign of Queen Elizabeth. An Act of 1601 (43 Elizabeth C3) granted, as a statutory right, pensions to soldiers who had been "maimed" in the service of Her Majesty—to be paid through the rates. Under Cromwell this became a dead letter but pensions were paid from grants by Parliament, but these were contingent on there being money available in the Treasury, which as time went on was not always the case.

**Historical
retrospect**

With the Restoration under Charles II, the well known Chelsea Hospital system was inaugurated. By a Royal Warrant, Commissioners were appointed to administer, in the interest of war-damaged or time-expired soldiers of the Standing Army, a fund which was provided by "poundage" levied on their pay. The duty of the Commissioners was to provide treatment and asylum for a limited number of in-pensioners. In 1685 the "out-pensioner" system was created—the basis of British pensioning for nearly three centuries. In the middle of the 18th century these out-patient pensioners numbered 9,700. Pension for disablement was at first—17th century—on a flat-rate, according to rank for all grades of injury, provided the man was "wholly disabled for service".

Early in the 18th century the pension was reduced to a flat rate of fivepence per day for all ranks. The award was made wholly on a statement by the commanding officer.

An Act and Warrant of George III in 1806 introduced the principle of good character and service as conditions for a disability pension, and made the amount proportionate to the extent of the injury. Though pensions were granted "wholly at the discretion of the Commissioners", they were based on

a clearly recognised *entitlement*—whether legal or of Royal Bounty did not affect the practical issue.

On these lines all the Warrants of the 19th century developed, with extraordinarily little change in amount of pension which was about 14/- to 17/6 per week for injury “in and by service”. In the middle of the century—reflecting Britain’s “Imperial” expansion—entitlement for disability due to “*climatic disease*” was recognised, as well as for wounding; and the medical service became concerned in the question of “entitlement”.

The Crimean War saw the introduction of the “voluntary system”, through the creation of the “Royal Patriotic Fund Corporation”, which assumed full responsibility for the pensioning of widows and children. (Widows received 5/- per week, widows with a child 7/-).

With the South African War Australia comes into the picture. It will be recalled that three sets of Australian contingents served in that war, the first being provided by the six States, the second enlisted and paid by the British Government, the third despatched and paid by the newly created Federal Government of the Australian Commonwealth. Certain pensions were afterwards paid by the Australian State Governments, but the British Government assumed the greater part of this responsibility.

The world war changed the whole outlook on pensions. Within a few months the regular forces were trebled in numbers by voluntary enlistments, and with the enactment of compulsory service in 1916 the Army became a vast national civilian levy. For men whose war service is but a temporary interruption of civilian life the analogy of industrial “compensation”, in known terms and legally claimable, comes naturally to be applied to military pension for “disability” due to war, as against the idea of a discretionary grant.¹

For two years the British Government tried to keep to the existing structure of administration, based on the War Office and Chelsea Commission (on the one hand) and the voluntary “Statutory Committee” of the Royal Patriotic Fund, on the other. Innovations were introduced, such as the principle of “*aggravation*” of existing disability, and *assessment* based on earning capacity. This dual structure however (as always)

¹ Epitomised from article in *Encyclopaedia Britannica*.

proved unworkable and the voluntary element disappeared to the great advantage of all concerned. At the end of 1916 an Act was passed establishing a *Ministry of Pensions*, perhaps the greatest piece of pensions legislation ever enacted. In its first Warrant of February 1917 the basis of compensation was radically altered. Previously assessment had been based on loss of earning capacity; the new basis was "degree of disablement by war service"—the extent of the disability sustained in consequence of wound or disease being adjudged *primarily on medical grounds*.

"This principle" (says the *Report of the Minister of Pensions, 1st April 1935 to 31st March 1936*) "met with general acceptance and has been adopted by practically all other countries."

The most important feature of the new system was that it recognised the principle that apart from routine administration of legislative enactments, *war pensioning is essentially a medical problem*.

As in Australia the British Ministry of Pensions accepted the principle, cardinal in the history of pensioning, that where an authentic doubt as to attribution exists, the "*benefit of the doubt*" shall lie with the claimant. In this matter it has had a clear advantage over the Australian "Repatriation" Commission—that through the National Health Insurance Act it has available the "previous (pre-war) history" of a large proportion of all claimants. No such system of available records exists in Australia.

Australia had no official system of military pensioning before the Great War. The British Government having accepted the obligation for "Colonial troops" in the South African War, the Australian reaction during that war was the creation of various national funds, some of which reached large amounts.² They were employed in assisting returned soldiers and their dependants.³

**Pre-war
pensioning
in Australia**

² The Commonwealth Government, however, accepted the responsibility for the replacement of artificial limbs. See *Vol. I, p. 534n*.

³ This introduction is based on Parry and Codrington's *War Pensions, Past and Present*; the article on War Pensions in the *Encyclopaedia Britannica 14th Edn., Vol. 23, p. 363*; and on information contained in various histories of the British Army; together with information supplied by the Repatriation Commission; and official documents.

The purpose in view in the rehabilitation, including treatment and pensioning, of the war-damaged soldier is *the restoration, in as full degree as possible, of his ability to take his place in the social scheme as a self-reliant and independent citizen without handicap through war-damage or loss*; or, as an inferior achievement, if full restitution is impossible by reason of physical disability or other handicap, such amelioration of its effects as shall be possible. A reward given in gratitude for his public service is given by "gratuity". An important "lesson" of pensioning, impressed on the writer by evidence from every quarter interested—the medical service, repatriation officers, the community, and ex-soldiers themselves—is that no material benefit conferred by the State could compensate the soldier for loss of moral fibre, and relegation to social dependence.

**Rehabilitation
of the
soldier**

The central problem of compensation for war injury, whether in the form of treatment or of pension, is that of entitlement to the receipt of such benefit. The nature of such entitlement has varied throughout the history of pensioning and in every country concerned. It has been decided on different principles and in different ways. The Australian view concerning "attribution (of any damage) to war service" has differed materially from that of any other nation. This, more than any other factor, has brought it about that—with the possible exception of the United States of America—her pension and treatment commitments have, so far as can be ascertained, exceeded, in proportion both to troops engaged and to population, those of any other nation.

**The cardinal
problem—
entitlement**

The history of "Reinstatement"⁴ in Australia presents itself in two periods: (1) the lifetime of the Australian Imperial Force, during which the problems of *treatment* and *pensions* were administered independently by several authorities; and (2) the period since 1st July 1920 when reinstatement became the exclusive task of a Federal department of state under the

⁴ It is surely time that the title of the Repatriation Department should be changed and the word "repatriation" restored in Australia to its universal meaning throughout the rest of the English speaking world. No Australian writer dealing with the return of the A.I.F. to Australia (repatriation) and its subsequent reinstatement in civil life can avoid embarrassment and ambiguity.

Repatriation Commission, which itself was under one of the Federal ministers.⁵ In this period treatment and pensioning were united under one administration, together with a variety of contingent responsibilities.

PERIOD OF THE WAR, 1914-21

The responsibility for providing for the war-damaged soldier was recognised at the outset of the war. Major-General

**1. Provision
for pension
benefits** W. T. Bridges, the first commander of the A.I.F., wrote on 8th August 1914 to the Minister for Defence:

I strongly recommend that the Government guarantee pensions to members of the forces and their dependants, and compensation for wounds on the same scale as are granted to the members of the Imperial Forces with whom they will be serving. The capital for this fund will probably be raised, as you suggested, by Patriotic Funds.

The principle of compensation for injuries caused in service was, however, by 1914 familiar to not only the military but the civilian mind, workers' compensation having become a normal right. The Government, being the employer of the soldiers, was naturally looked upon as responsible for this compensation and in the War Pensions Act, passed on 21st December 1914 it accepted the duty

to provide for the grant of pensions upon the death or incapacity of members of the Defence Force of the Commonwealth and members of the Imperial Reserve Forces resident in Australia whose death or incapacity results from their employment in connection with warlike operations.

Pensioning at this time naturally came under the Treasury. The Act provided for a Pension Board of three persons including one qualified medical practitioner. This Board was empowered, with the approval of the Minister, to assess, or review pensions, and in certain cases—where the rate of pension was not more than 30 per cent. of the rate of total incapacity—to sanction the payment of a lump sum. An amendment of 2nd September 1915 provided for a Commissioner and an Assistant Commissioner for Pensions, and, in each State, a

⁵ The portfolio of "Repatriation" may be held by a Minister as part of multiple portfolios and responsibilities. The status of the Commission is examined later.

Deputy Commissioner. Each Deputy Commissioner was charged with

determining whether the death or incapacity of a member of the forces in fact resulted from his employment in connection with warlike operations, and in the case of incapacity the nature and extent thereof.

Regulations of 25th March 1915 had defined "incapacity" as bodily or mental infirmity which wholly or in part prevents the earning of a livelihood and which results or has resulted from employment in connection with the warlike operations referred to in the act.

Provision had been made for the Deputy Commissioner to obtain from the Defence Department

a copy of the record of the member of the forces who is referred to in the claim. In the case of a member of the forces who, it is claimed, suffers from an incapacity, the Deputy Commissioner may accept such evidence of incapacity as is part of the member's record; but, if not satisfied by that evidence, he shall take such other steps as to him seem desirable in order to ascertain the nature and extent of the incapacity. For this purpose he may request a Commonwealth Medical Referee to make an examination.⁶

After invalids had reached Australia, and had received any treatment in Base Hospitals, a military medical board determined whether they were to be returned to duty or discharged as unfit for further military service. In the latter case each soldier was instructed to apply to the Deputy Commissioner for Pensions in his State for consideration of his entitlement to a pension.

Military district headquarters were instructed to see that no undue delay occurred in finalising pension cases.

All necessary documents are to be lodged with the Commissioner or Deputy Commissioner of Pensions in sufficient time to admit of the case being dealt with before the date of cessation of pay as a member of the A.I.F. expires.

In 1916 a change was made in the system by a decision that pensions should be allotted on the recommendation of military medical officers. For this purpose Permanent Medical Referee Boards were established in each Military District each Board consisting of two members with "extensive military experience, in addition to necessary medical qualifica-

⁶ Commonwealth Medical Referees had been appointed to examine claimants for pensions under the Invalid and Old-age Pensions Act 1908-12.



29. INTERIOR OF "RAILWAY WARD". 6TH AUSTRALIAN GENERAL HOSPITAL, KANGAROO POINT, QUEENSLAND

The patients are men who have been "invalided" to Australia as "unfit for military service".

*Photo from Department of Agriculture and Stock, Queensland
Aust War Memorial Collection No H2245*



30. THE SURGICAL BLOCK AT "ROSEMOUNT" HOSPITAL, QUEENSLAND

This hospital began in 1916 as No 4 Australian Infectious Diseases Hospital. It is now the Repatriation General Hospital, Rosemount.

*Photo from Department of Agriculture and Stock, Queensland
Aust War Memorial Collection No H2257*

To face p 792.



31. Disabled soldiers in the workshops of the "Red Cross Toy Industry", Sydney, N S W

*Photo from the Red Cross Society
Aust War Memorial Collection No H11726*



32. Returned soldiers being trained for an outdoor occupation at the Agricultural College, Dookie, Victoria

*Photo from the Repatriation Commission
Aust War Memorial Collection No H12910*

THE PROBLEMS OF "RE-EDUCATION" AND "REINSTATEMENT"

tions". Their duties were the examination of all cases submitted to them from the "Local Medical Referees" and assessment of the extent of incapacitation, for the guidance of the Deputy Commissioner of Pensions.

Instructions regarding Invalids in Australia, issued by the Defence Department from time to time, laid down that

no soldier returned from overseas whose ailment or cause of rejection is due to, or has been aggravated by, service will be discharged for medical reasons except on the recommendation of the Permanent Medical Referee Board.

The Permanent Medical Referee Boards were instructed that it was desired that

full consideration be given to cases, and wherever there is any doubt as to the extent of incapacity, the soldier should usually be given the benefit of such doubt, subject to review at a later date.⁷

Until 1920 the war pensions authority—Board and Commissioners—came under the Treasury and were administered by its Pensions Department in close association with and operating on the same lines as Invalid and Old Age pensioning. This arrangement may have saved the community a few thousand pounds in administrative expenses but the financial gain was at a heavy spiritual cost, some of the worst features of war pensioning in Australia being traceable to this early association.

**Defects of
Public Service
control**

In the first place the attitude toward the soldier pensioner became infused with the sense of "charity". An illustration of the attitude toward war pensions is seen in the tendency at first to apply to the soldier pensioner the principle that made an invalid or old age pension conditional on *indigence*. Though this was entirely alien to both letter and spirit of war pensions legislation, an attempt was made to introduce it into administration. Two evil consequences followed. First, the ex-soldier felt that the department was antagonistic, and therefore to be fought—and that in this war all was fair. Second, it accentuated

⁷ The instructions contained very exact and intelligent directions for medical officers in the preparation of the Board Paper to be filled in on the soldier's discharge; these were laid down in a special appendix. The writing was to be distinct and the form confidential. The invalid was to sign his statement as certified by him to be true. Had such a form been carefully and exactly filled in for every discharged soldier the history of entitlement would have been different.

the danger—already very serious—that the damaged soldier would be deterred from any attempt to improve his wage-earning capacity by reparative training and re-education, since in so doing he stood to lose part at least of the pension attributable to his disability. This risk was very far from imaginary. In the “open labour market”—whatever be the form of labour other than purely sheltered and intellectual—a physical disability is a handicap whose gravity becomes evident when economic stress throws all but the fully efficient man “out of work”. A 30 to 40 per cent. disablement may then become as serious a disadvantage as a 100 per cent. one. For many, the only refuge from the rocks lay in “preference to returned soldiers”.⁸

Another and fundamental heritage from Civil Service control was the divorcement of the medical profession from any responsible part in the conduct of the Department, and an attitude towards the profession which accentuated this divorcement. The opinion given by the medical man examining the applicant for invalid pension was subject to rejection, amendment, or revision, without consultation, by a non-medical staff. The system of record was calculated—doubtless through lack of scientific awareness—to prevent scientific use being made of these important clinical records of the public health: records were filed strictly by individual name; and no provision for cross-references permitted the statistical assembling of causes of disablement; the original pensioners were not distinguished from dependants, all being massed in an alphabetical register. Some of these influences were escaped later by the Repatriation Department when it took over the responsibility; but, as will be seen later, some of the most important defects remained.

⁸ British and French experience in this respect is of interest. In a report for the British Secretary of State for War by the British Ministry of Munitions liaison officer, in 1917, the reference is made to “great difficulty in the way of re-education, which is causing much anxiety in France, as it will probably do in England. . . .” This difficulty was due in part to the “inability of the State to control a man after he leaves the Army” in the way of re-education, or even to compel it while still a soldier; and the unwillingness of many men to undergo such re-education, and even to co-operate in the final stages of reparative medical treatment “in the belief (an ‘absolutely untrue’ one in France) that if a man is seen to be earning a good living his pension will be reduced or withdrawn”. In Britain the extraordinary situation arose, that the muscular re-education that formed an essential part of all reparative surgery and treatment directed to the restoration of function was deliberately divorced from any element of utility because of the fear of the soldiers that the purpose of the exercises was to fit a man for discharge from the Army and put him again on the competitive labour market with a handicap.

The Australian Imperial Force had hardly settled down to its strenuous training in Egypt in 1914 than the inevitable problems of the aftermath of war first showed signs of their nature, first by the deaths and incapacity resulting from the wave of inspiratory infection that the force encountered on the voyage and in Egypt, and secondly by the "unfits" exposed as a result of the training.

**2. Provision
for
treatment**

Provision for treatment of the returned invalid even, to some extent, after discharge from the Army, was in this first stage accepted by the medical branch of the Department of Defence. This was, however, as has been seen, assisted by the voluntary bodies and funds on which the task of reinstatement was largely allowed to fall. It is difficult to realise, even at this short distance of time, to what an extent these problems were then unexplored, and even, at first, unrealised; and as usual in Anglo-Saxon countries it was largely the voluntary bodies that led the way in exploration and settlement.⁹

But while the record of these voluntary efforts gives Australians just cause for pride there can unfortunately be no question but that some activities, emotionally applied, lacked a strong, well-informed direction and were gravely prejudicial to the best interests of the Australian soldier.¹⁰

In May 1916—to give united direction and to secure uniform treatment for returned soldiers in the several States, the Commonwealth Government passed the Australian Soldiers Repatriation Fund Act which continued the reliance on voluntary funds but under the central direction of a board of trustees. The Act gave them a charter to appeal for money, which was to be distributed mainly through the voluntary "State War Councils".

On 12th January 1917 Surgeon-General Fetherston asked the Minister for Defence for a direction as to "who should take

⁹ The social aspects of this fine work have received full attention in *Vol. XI, Official History of Australia in the War*.

¹⁰ For example, much of the effort expended in the "curative workshops" in the hospitals was according to an experienced officer of the Repatriation Commission, "a waste of time and money—eyewash". Yet there is ample evidence also that when directed toward an exact purpose—*either curative or vocational* and with their purpose clearly indicated to the soldier, they achieved a most important purpose, as illustrated in the admirable report of Mr. James Nangle, Director of Vocational Training, 1919-23.

charge of disabled soldiers after discharge". He himself recommended that

the States be asked to take charge of these cases after discharge from the army—with possible contribution from the Commonwealth Government. Failing this a special branch or department of the Commonwealth be established to do so, to be assisted in every way by the A.A.M.C.

A conference was accordingly called between the Treasurer and the Minister for Defence (and attended also by the D.G.M.S. and the Secretary to the Treasury) at which it was decided that the Treasury be asked to formulate proposals. Mental and consumptive patients were to be dealt with through the States, and physically helpless men by the Treasury itself. With regard to the limbless soldier, the Defence Department on January 24th informed the Prime Minister that it would "undertake to supply the first artificial limbs, and instruct (men) in their use" but that "the function of training men for re-establishment in civil life is more properly associated with Repatriation". The Defence Department asked whether the Repatriation Trustees were prepared to take over the whole work of manufacturing artificial limbs for incapacitated soldiers.

In September 1917 the Federal Parliament passed an *Australian Soldiers' Repatriation Act* and a Commonwealth Minister for Repatriation, Senator Millen, was appointed. The whole problem was complicated by the sovereign rights of the States throughout this field of action, and the Federal Act laid down no policy, nor did it set up any machinery. It merely created an authority for holding and distributing funds and organising the work. This authority was invested in a Board of six Commissioners with the Minister for Repatriation, Senator the Hon. E. D. Millen, as Chairman and head of the Repatriation Department. The Commissioners acted in an honorary capacity. The duties of the Department were to prescribe by regulation the nature and extent of the assistance that would be granted, and to hear appeals from decisions of the State Boards. Its permanent head was known as the Comptroller. District branches were established in the capital city of each State, and associated with these branches were State Boards, comprising seven members, who also acted in an honorary capacity. The

permanent head of the State organisation was termed Deputy-Comptroller. A network of voluntary local committees was connected with the district branches.

The Central Commission, in addition to drafting regulations, had to devise and direct the "Repatriation" scheme. As stated in its first general report:¹¹

Every case is a special case, whether it be that of a soldier or of one of his dependants, and whether the application be one for re-employment, training, or general assistance. No man who passed through the battle zone returned to the Commonwealth in a normal condition. To outward seeming, many of the returned soldiers have appeared much as they were upon their departure. The subtlety of the Repatriation problem is contained in this very fact.

The policy of the Department was based upon four main principles:

(1) To secure the re-establishment of returned soldiers in the industrial life of the community to the fullest extent that circumstances permitted;

(2) To sustain these soldiers until an opportunity for such re-establishment was assured; and

(3) To provide for the dependants of soldiers who died on active service, as well as the dependants of soldiers, who on account of injuries sustained, were unable to provide for those formerly dependant upon them.

(4) To provide medical treatment for returned soldiers who were suffering from disabilities caused or aggravated by war service.

In March 1918 regulations were promulgated concerning Local Committees, Soldiers' Industrial Committees, Sustenance Allowances, Surgical and Medical Treatment, Business, Furniture and Equipment, Transportation, and other subjects. Provision was made for artificial limbs and surgical appliances and for treatment of soldiers in their homes. A Departmental Medical Officer was appointed to each State branch of "Repatriation" and local medical officers in every local committee district throughout the Commonwealth.

On 8th April 1918, when the act came into operation, 44,671 men had been discharged from the A.I.F.

There can be no doubt but that this semi-voluntary body—which had to break much ground that had never been touched before in any country—played a very important part in planning

¹¹ *Interim Report upon the Organisation and Activities of the Repatriation Department, 8 Apr., 1918 to 30 June, 1919, p. 5.*

the lines and sowing the first crops of the prodigious growth of national activity which eventually sprang therefrom. Its difficulties and achievements have been admirably set out in *Volume XI* of the Official History. It falls to the lot of the medical history to introduce a critical note whose constructive purpose will perhaps justify it. Commenting on the Act the *Medical Journal of Australia* of 13th April 1918 has this pertinent note on the arrangements for "vocational training":

The experience of the past three years and more teaches that, unless the system of professional re-education is co-ordinated with a well-adapted system of physical training and mental treatment, satisfactory results will not be attained. . . . The best results can only be anticipated if the repatriation is begun as soon as the soldier leaves the battle field. We have pointed this out over and over again. There is no mention in the new scheme of any early endeavour to restore the men either mentally or physically. In the British scheme and in the French scheme there is an intimate association between the orthopaedic and neurological services and the later professional re-education schools. The patient should be given the advantages of all the skill our Australian orthopaedic surgeons possess not only after their return to the Commonwealth but also in Europe and at sea. The treatment should be combined with a properly planned endeavour to remove the effects that war impressed upon the nervous system of the soldier. . . . We fear that the makeshift of providing training at technical schools or colleges, or even in specially established national workshops, will only result in a moiety of restoration. Apparently the co-operation of the medical profession in vocational re-education is not being sought.

The responsibility of the Repatriation Department at this time for the treatment of members of the A.I.F. became operative only after discharge from the military hospitals. Up to that point treatment was the obligation of the Defence Department, which was requested by the Repatriation Department not to discharge any invalid until further active hospital treatment was no longer needed or availing. To save duplication of institutions it was arranged that the Defence Department should continue to utilise its medical organisation for the treatment of any patients who after their discharge were referred to it by the Repatriation Department.

This arrangement, however, did not free the Repatriation Department from the necessity of making very extensive supplemental provision for treatment. The military hospitals were situated in or near the capital city of each State, and could only be utilised conveniently for metropolitan cases and

for country cases requiring continuity of care. Urgent or minor cases occurring throughout the country had to be provided for by the Repatriation Commission, and its medical officers had also to

Examine men unfit to return to pre-war occupations and to advise as to their physical suitability for such courses of vocational training as might be indicated;

Examine men who claimed to be fit only for light employment, with a view to ascertaining whether there were actual disabilities in support of their claim or whether treatment would improve their physical standard;

Conduct such examinations as might be necessary in the case of men seeking treatment.

Associated with the principal medical officer at Repatriation headquarters was a Medical Advisory Committee. Associated with the senior medical officer at each branch office were consulting specialists whose services might be requisitioned in cases involving doubt or difficulty. Broadly speaking the Repatriation Commission undertook out-patient treatment in metropolitan hospitals, and all treatment in country hospitals, in the applicant's own home, in convalescent homes, and of incurables in special institutions.

As the Department undertook to provide treatment only for "disabilities due to or aggravated by war service", it became necessary to define these terms in view of a natural tendency of ex-soldiers to seek treatment for infirmities outside the scope of the provision. Definitions and interpretations were therefore laid down as follows:

(a) *War service*.—The period served in the Naval or Military Forces from the date of attestation to discharge.

(b) *Due to war service*.—A condition which has been caused during the period of Naval or Military service; to include a liability to contract an ailment or suffer prejudice as the direct or indirect result of injuries or other disabilities received during the period of service.

(c) *Aggravation*.—Any condition which the soldier was predisposed to prior to or during his period of service, and which has become intensified during such service; the onus of proof of aggravation to be upon the applicant.

It was already difficult to determine whether certain disabilities were either due to or aggravated by war service. In 1920 the Commission reported that this was

a difficulty which is likely to be accentuated by the passage of time. The main evidence is that furnished by the Medical History Sheet, and experience has shown already that this is not always a reliable guide. In cases of doubt the policy of the Department has been to give the applicant the benefit of such doubt.

In an appendix to its report for 1921-22 the Commission traversed the whole medical problem-field, as it then presented itself. It is clear that departmental medical officers were fully seized with both the importance and the difficulty of their task, and also with the conviction that it was as much their duty to promote the soldier's claim and to apply the "benefit" of proper "doubt" as it was to prevent any improper exploitation. Nor is there evidence that this attitude has since changed.

The Department undertook to supply gratis all necessary treatment, surgical aids, and medicaments; all hospital fees, transport expenses to and from hospital and sustenance for the period of treatment. But until 1920 the Department was less directly concerned with the actual treatment of war disabilities than in detecting the need for treatment in the men discharged.

The convalescent homes established first in various parts of New South Wales were due to the initiative of the Red Cross Society; and, recognising their value within prudent limits, the Department invited the Federal Executive of the Red Cross to arrange for them in the other States, a task which was at once undertaken.

Responsibility for the care of *mental patients* rested until 1921 with the Defence Department, Repatriation paying per capita maintenance charges and living allowances. In all instances use was made of the existing State mental hospitals, partly because these had the only expert staffs available, and partly because the States alone had the proper legal machinery for dealing with the affairs of the mentally afflicted. In some States special Acts were passed to obviate the necessity for lunacy certification in the case of soldiers, and permit the administration of their affairs by the proper legal authority.

Up to 1920, according to the Defence Department's statistics 1,820 members of the A.I.F. had contracted *pul. tuberculosis*; in many instances, however, symptoms became manifest only after discharge. The Repatriation Department therefore allowed a period of two years from the date of discharge during which

tuberculosis might be regarded as a war disability. At the end of June 1920, 487 tubercular patients were still in institutions controlled by or for the Defence Department and the Repatriation Department. The balance were dispersed throughout the community.

Recognising that "one infective tubercular uncontrolled is a greater menace to the public health than 1,000 tuberculars under adequate supervision", the Minister approved a very comprehensive scheme for dealing with this class of invalid. Under this scheme three classes of tuberculars were recognised:

- (1) The incipient cases for which sanatorium treatment was indicated.
- (2) The arrested cases for which light rural occupations offered the right conditions for the stabilisation of health,
- (3) The advanced cases for which a well equipped and generously conducted hospice constituted the appropriate provision.

By co-operation of the Department of Defence and the Director of Quarantine an effort was made for the control of *bilharzia* and *malaria*. The action which stamped out bilharzia has been described in the last chapter. Of malaria the distribution was wide, and the Director of Quarantine, with the concurrence of the Repatriation Department, circularised the local Repatriation medical officers asking them to report cases of malaria to him. The areas were charted and preventive measures taken.

In May 1920, in response to representations from the great body of returned soldiers, was passed the Australian Soldiers'¹²

Repatriation Act of 1920, which combined
3. Pensions and treatment: the Repatriation Commission the War Pensions and the Repatriation Departments. It was obvious that the payment of pensions for war disabilities and the medical treatment of those disabilities required close alliance, and the Act amalgamated their control.¹³ It abolished the honorary Commission, and honorary State Boards, and substituted a paid Commission and paid State Boards, each

¹² Soldiers includes men who served in the Navy and Flying Corps, and also nurses.

¹³ Of necessity the Repatriation Trustees had already been forced to concern themselves with some of the preliminary steps of pensioning

with three members. General control of policy was still reserved to the Minister, but the Commission was given executive powers, and the former functions of the Comptroller of Repatriation. The control of war pensions passed to it on 1st July 1920, the date on which it took office.

The Act provided for pensions to members of the Australian forces on active service outside Australia whose death or incapacity

results or has resulted from any occurrence happening during the period he was a member of the Forces; does not arise from intentionally self-inflicted injuries; and does not arise from, or from any occurrence happening during the commission of, any breach of discipline by the member; or whose death or incapacity results or has resulted from his employment in connection with naval or military preparations or operations.

The Act also laid down a new pensions schedule consolidating in certain cases Repatriation allowances and pensions and also creating special schedules for the blinded and permanently incapacitated classes. Pensions, not exceeding the special rate, could be granted to tuberculous patients who had been for at least six months inmates of special homes or hospitals and had been discharged from these.

On 31st March 1921, the Australian Imperial Force, except for a few still left overseas, ceased to exist, and the whole responsibility for treatment of war disabilities rested with the Department of Repatriation. Medical institutions were entirely transferred from the Defence Department.

By 1920, though the armies had returned and the flow of sick and wounded had ceased, the problems of after-treatment of the men returned damaged were brought in higher relief by the loss of the great purpose and incentive that had sustained the nation as well as the armies. No spiritual or economic impetus had replaced it. The attitude of the community toward the soldier, and *vice versa*, had begun its inevitable change. He was now a competitor in the struggle for existence: hero worship was replaced by critical suspicion. The returned soldier, on his side, had become an important element in the political life of the community and was himself aware of what history has proved, that he must be prepared to fight to ensure that the Acts passed in justice to him were

interpreted in the spirit and "intention" animating Parliament and people at the time of their enactment.

From that time onwards the system has consistently developed in two directions: first, the grounds entitling members of the forces to pensions have been progressively widened or grounds of rejection of their claims have been diminished; second, the medical profession which, with the appointment of the Commission, had again been allotted a vital responsibility in deciding whether disability resulted from war service, ultimately had that responsibility again withdrawn from it and placed on a legal Appeal Tribunal.

It is not proposed closely to follow here the enlargement in the grounds of pensioning. This began when the Act was widened in December 1921 by an important amendment:

Notwithstanding that the origin of the cause of death or incapacity of a member of the Forces who, after enlistment with those forces, served in camp in Australia for at least six months or embarked for active service with those Forces overseas, existed prior to his enlistment, where in the opinion of a Board—

(a) the condition of his war service contributed to any material degree to the death or incapacity of the member, and

(b) neither the death or incapacity, nor the origin of the cause of the death or incapacity, was due to the default or wilful act of the member,

the Commonwealth, shall, subject to this act, be liable to pay to the member, or his dependants, or both, as the case may be, pensions in accordance with this Act—provided that no pension shall be payable under this sub-section except in pursuance of a claim made within six months after commencement of this sub-section.

THE PROBLEM OF ENTITLEMENT

Immense difficulties began to foreshadow their early appearance in this problem of entitlement. In some measure trouble was made inevitable by the constitution of the Commission itself.

The fact that the Australian machinery for determining the fundamental questions of restitution and for directing and carrying out the major technical responsibilities was a sub-department of the Commission instead of, as in the British system, a directorate immediately under the Ministry, influenced the outlook and eventually determined the development of the Australian system. The inherent difficulties of interpreting the Act appeared in the tremendous rush of pension claims

in the early 1920's. The problem had two sides; a purely medical one—was the disability, of which the soldier complained, due to or aggravated by “any occurrence happening during the period he was a member of the force”? and a legal one—what did Parliament mean when it used those and other words?

The disputes were so acute that in 1924 a Royal Commission consisting of medical men from the five eastern States of the Commonwealth¹⁴ was appointed to advise on the question:

Is the present method of determining whether an ex-soldier's disability is due to or aggravated by war service adequate to decide the origin or the degree to which it is aggravated, and what portion of his present incapacity can be regarded as having resulted from his war service?

They reported that, while the machinery for determining disability was in most cases adequate, some rulings made with the object of facilitating the grouping of cases had caused hardship in exceptional cases; the chief difficulty, however, had been the appearance of disabilities much longer after a soldier's discharge than the legislators or administrators had anticipated when the Australian Soldiers' Repatriation Act was framed. This led to

the necessity of investigating the possible relationship to war service of illnesses appearing long after discharge. Delay is often unavoidable while efforts are being made to trace some connection and discover some continuity that will enable those interpreting the Act to establish a relationship between the illness under review and war service.

The Royal Commission also found: “The Repatriation Commission is greatly hampered by the *inadequacy of the records as to the exact state of health of soldiers upon discharge from service.*”¹⁵

The difficulty of the problems presenting themselves in the vast congeries of morbid states varies enormously—from the mere decision that inability to see was due to the loss of both eyes, to the decision that a corneal opacity causing blindness, coming on twenty years after the war, was due to gassing; or from the decision required in the case of chronic bronchitis

¹⁴ Sir Charles Bickerton Blackburn, Chairman, Drs. E. Sandford Jackson, H. S. Newland, W. W. Giblin, A. V. M. Anderson.

¹⁵ The italics are the present writer's.

and emphysema in the man whose medical sheet carefully describes a struggle for life with broncho-pneumonia, and tardy recovery, to the application from the man who vaguely claims to have been exposed to a gassy atmosphere for some weeks in the Ypres Salient in 1917. Decisions on such claims have involved a progressively greater degree of uncertainty as the years have gone by. In the early post-war years attribution was commonly obvious; even if the records were defective, pathological facts as a rule readily determined the relation to a war experience. But very soon the question of attribution to war experience became more and more a matter of indirect evidence and argument or based on "continuity" of symptoms from the war to the time of the claim. The importance of records became more and more evident and their lack to be deplored. The records of the medical department of Repatriation are indeed eloquent of the fact that not only the public purse but, what is more important, justice to the returned soldier demand that *the maintenance in the war of individual records should be held a matter worthy of the direct and careful oversight of the Adjutant-General.*

It might have been supposed that a medical mind would have been charged with decision of the purely medical question and a legal mind with that of the purely legal one—or that the ultimate deciding authority would include a doctor and a lawyer. This was in effect the solution adopted in Great Britain. In Australia, however, as has been seen, another course had been taken by the Pensions Department of the Treasury. It referred any pension case coming up for review in metropolitan centres to the Medical Referee Boards and Specialists provided by the Defence Department, and in country towns to local Medical Referees. But the ultimate decision whether or not to accept the medical opinion on the medical question was reserved for the Commissioner of Pensions himself.

When the Repatriation Department took over the procedure became as follows. When a pension claim was made the *prima facie* case contained in the report of the local medical representative caused a summons to be sent to the applicant to attend at the office of the Deputy Commissioner for Repatriation in the State capital for complete examination by a medical

officer of the Staff. For this enquiry every resource of the medical profession was available. The applicant was sent, if necessary, to the Repatriation Commission Hospital and there underwent research by specialists—test meals, blood tests, X-rays, bacteriological investigation, psychological examination, and so forth—together with exact observation over such period as might be thought desirable. The recommendation as to whether the disability was due to or aggravated by war service was based on (1) diagnosis of the nature and cause of disability; (2) examination of personal records of wartime medical experience; (3) medical judgment as to the relevance of these to the condition disclosed by the examination; (4) post-war history and medical evidence provided by the applicant himself.

The recommendation of the medical officer, *viséd* by the "Senior Medical Officer" in the State, was adjudicated by a State Board¹⁶ and its decision was conveyed to the appellant who was also informed of his right to appeal to the Commission. When the Commission was in any doubt it referred its final legal problems to the Solicitor-General of the Commonwealth, Sir Robert Garran, and its medical ones to a Medical Advisory Committee so distinguished in capacity and character and by the pains with which it carried out the work that its recommendations, like Sir Robert Garran's, carried overwhelming weight.¹⁷ There was at this time no appeal from the

¹⁶ This comprised the Deputy Commissioner and two others—eventually the Chief Clerk or Chief Pensions Officer, and a representative of the Returned Soldiers' League appointed by the Governor-General from a panel of three proposed by the R.S.S.I.L.A. This board could accept the medical opinion but could not act in contravention of it. If it disagreed the case went to the Commission in Melbourne.

¹⁷ Two important opinions of Sir Robert Garran should be noted. In 1922 he was consulted by the Commission as to "whether a war pension should be payable in the case of a disability where medical opinion is to the effect that the disability is constitutional, or may or may not have arisen during the ordinary course, *i.e.*, whether a man was a member of the Forces, or a civilian".

The germ of his reply was. "I think the real meaning is that if the first cause of the disease was pre-war and incapacity came on as an inevitable result and was not hastened or aggravated by anything happening during service, no right to pension accrues under section 23 (1) of the Act notwithstanding that actual disablement occurred (or symptoms became manifest) during service."

In 1927 the Commission put to him the question. "In the case of infectious diseases common to the civil and military population, but contracted on service (for instance, Typhoid Fever, Cerebro-spinal Meningitis, Measles, etc etc) the Commission accepts these as pensionable under the Act, and where there is any doubt as to whether any disease, even a non-infectious one, commenced on service the Commission similarly accepts the responsibility, even where the war service cannot be said to have caused the sickness."

"In doing so, we are not certain that we are acting rightly, and we shall be glad to have your opinion."

The reply was. "Incapacity arising from the diseases mentioned, . . . if the diseases were contracted on service, is in my opinion, pensionable."

Commission's findings except on the production of fresh evidence, in which the soldier was assisted.

The task of the Medical Advisory Committee was very different from that of the Solicitor-General by reason of the decision, made by the Committee soon after beginning its task—that, from the medical point of view, every case must be treated on its merits: it could not make decisions applicable to groups of disabled men. Thus, while references to the highest authority on points of law were comparatively exceptional those to the highest medical authority involved days of patient investigation weekly, the Committee realising that it was, in effect, a final court of appeal on that aspect.

The first committee consisted of Sir Henry Maudsley, Sir George Syme, Sir Richard Stawell, and Dr. J. Ramsay Webb. At a later date, Dr. T. E. V. Hurley, Dr. S. O. Cowen, Dr. B. T. Zwar and Dr. H. Hume Turnbull were appointed to the Committee replacing the original members. As occasion required, other senior consultants were co-opted to the committee to advise on special problems, Sir James Barrett—Ophthalmology—and Dr. Clarence D. Godfrey—Psychiatry.

These medical men were among the most eminent in the medical profession in Melbourne. The Commission also freely availed itself in cases of special difficulty of the services of "senior consultants" and "specialists" throughout Australia. The committee met twice a week, and, assisted by the Principal Medical Officer, and with the fullest co-operation of the Commission examined the evidence from every possible standpoint, discussing the pros and cons of each element in the claim, in the light of their knowledge of medicine, of war conditions and of men.

The following are notes made by the present writer who, during 1925-32 by invitation of the Commission, was present at many sittings of the committee and with whom Sir Richard Stawell, then its chairman, kindly discussed certain aspects of its experience. They reflect accurately the views of the Committee, but not necessarily those of the departmental officers, in particular as to the decision to "treat each case on its merits".

"Sir Richard Stawell selected certain types of disablement from disease that occurred in pensioners in large 'blocks'—

chest complaints; cardio-vascular conditions, both chronic and organic (hyperpiesia, etc.), and temporary (for example 'effort syndrome'); chronic rheumatism ('rheumatic syndrome'); nervous conditions—organic diseases and war neuroses.

"He pointed out to me that a matter of fundamental importance in the medical problem of pensioning is the *wording of the Act*, and the *legal interpretation given thereto*. 'Occurred on service' is held to be equivalent to 'due to service'; 'occurred on home service,' on the other hand is only held to imply 'due to home service' if its occurrence was related to the actual performance of military duty. *Occurrence* is interpreted to mean *first occurrence* or *manifestation* of symptoms that could be held to be definite symptoms of the disease for which a pension is claimed.

"The trouble with the Act is that it was drawn up without effective reference to medical opinion. The consequences that arose from this have been very momentous.

"The examination of any claim for pension necessitates an answer being found to the following questions:—First, 'what is the actual nature of the disease, or what is the significance of the symptoms on which the pension is claimed?' Second, 'did the disability, or the symptoms that are claimed to point to the existence of some disease, actually occur on service?' and, third, 'if so, did they first occur while on service?' Put the other way: 'were certain symptoms, that are accepted as having occurred on service, actual manifestations of the particular diseases or disease tendency in question? and could they be held to prove that the disease either had its origin in active service? or, if present before service was it brought to the stage of actual disease by war service, or its effect aggravated thereby?'

"Every man (Dr. Stawell pointed out) including ex-A.I.F. men must die at some time, and most of them from disease; and in each instance the question is liable to arise, and in many will arise, whether or not the widow is entitled to pension in virtue of the fact that the disease from which the soldier dies may have been started, or its manifest onset have been accelerated and its course aggravated, by war service.

"A pension is paid on proof—(1) that the first symptoms of the disease occurred on war service; (2) of aggravation by

war service of a pre-existing tendency to disease, or of an actually existing disease.

"The fact that the first manifestation of symptoms of disease was noted under service conditions, is taken as equivalent to proof of the disease in question having been *caused* by service conditions.

"Criteria of disease having resulted 'from an occurrence happening on service' are:

1. No evidence of occurrence of symptoms before service.
2. Their definite manifestation on service.
3. Their continued and progressive occurrence since the soldier's discharge from service.

"A moral obviously implicit in these points is the importance of *the first medical examination of the recruit*. This should be sufficiently exact to detect the most important disease tendencies—such as high blood pressure, neurosis, fibrosis—as well as any actual disease existing, or latent. Specialists—e.g. heart, mental, eye and ear—should be called in.

"As an example of a chronic disease condition for which aggravation might be claimed hyperpiesia is typical. The most important factor is that *its cause is not known*.

"It was at first thought by the Medical Advisory Committee that the decision, whether a condition was or was not 'aggravated by war service', might be arrived at on some precise general principles, but the Committee found by experience that each case must in large measure be decided 'on its merits'.

"Proof of *causation or aggravation by war service* is based on evidence regarding—

1. Health before service.
2. Length of service before occurrence of symptoms.
3. Type of service.
4. Nature of disease manifestations on service (as evidenced by Board Papers, or other documentary evidence).
5. Present condition.

"Many of the chronic diseases responsible for large 'blocks' of pensions must start at the front in small groups of cases reporting sick with slight symptoms; but the end history of the men who show such slight symptoms is difficult to get. The end history, for example, of men invalided for 'senility'

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is most important; a recruit *on enlistment* should give his age on oath and a false declaration should involve loss of pension rights. False statements of age at enlistment, and the problem of 'senility' in general as influencing the onset and development of chronic disease, furnish some of the most difficult problems, whether for *cause* or for *aggravation*.¹⁸

**Disease groups
affecting
pensions**

"Sir Richard Stawell mentioned the following disease groups:

"1. *Cardio-vascular system*

"1. Chronic disease—i.e. 'disease' syndrome associated with definite pathological changes. Of these *arterio-sclerosis* and *hyperpiesia* are typical. At the front, they must form but a small group and would appear but seldom in hospital records, or A.F.B. 103; but now they constitute an important 'block' of pensionable conditions. Again an important feature in all of them is the fact that their *cause is unknown*.

"2. 'Acute' manifestations of cardiac 'trouble' other than the effect of organic disease (and excluding acute infections). This group is typified by 'effort syndrome' or 'D.A.H.' In this group the term 'acute' refers rather to the absence of morbid structural changes than to nature of the symptoms.

"This was a large group at the front and it still constitutes a large group of pensionings, either as an 'entity' or as a complication or concomitant of other conditions.

"The group as found at the front may be considered to have resolved itself as follows—

"(a) A small number of cases were due to *acute constitutional illness* (such as acute infection), to *latent tuberculosis* or other definite pathological state. These have either got well or have revealed their essential nature.

"(b) *General exhaustion due to exposure and privations* in a man psychologically sound, but through the severity of the mental strain temporarily the subject of neurosis. These also have cleared up.

"(c) The largest group consists of men with pre-existing nervous weakness or 'diathesis', in whom the strain of war has brought about an 'anxiety state'.

"In the cardiac neuroses—

¹⁸ It is of interest to observe that while at the front the "disease" picture is represented by a large number of more or less definite morbid states, when these reach the stage of pensioning we are concerned with vague general disease states, whose cause may be multiple and is often wholly unknown.

An attempt is made in this history to relate the problems of the R.M.O. in the field to those of the medical officer responsible for adjudicating pension claims. Each of these officers must regard the man before him from two distinct points of view. Each is called upon to do justice to the individual—the R.M.O. to evacuate the man unfitted for fighting through sickness, the pensions officer to accept the pension claim of the man unfitted for work from the effect of disease incurred at the front—perhaps that same disease on which the R.M.O. had to evacuate him. On the other hand each officer is concerned with safeguarding the interest of the community—the R.M.O. considering the interest of the Army, which will be weakened by the man's evacuation, the pensions officer considering that of the nation, whose financial stability and morale would be imperilled by indiscriminate pensioning.

"(a) At the front the war experience of the soldier *made manifest* a nervous instability and caused D.A.H.

"(b) After the war the problem of re-establishing himself against heavy competition perpetuated it.

"(c) In a certain number of cases the conditions on service brought about by infection and nervous strain had their sequel, or a parallel morbid state, in civil life, in the form of some *focal toxic condition* associated with *struggle for existence*.

"In each instance the result is an *anxiety state* manifesting itself in *effort syndrome*.

"3. '*Gas poisoning*' as seen to-day must in a large number of instances be looked on as a *cardio neurosis*. What may have been the war cause of the condition now found in such cases—whether indeed gas was concerned at all—is often most obscure. The essential question from the pensions standpoint is, *why has it persisted?* In each case it must be asked, is there not a focal infection? If so, can we remedy it? But how can we show that focal infection, *e.g.* 'U.R.T.I.', if found, is indeed a factor of any real import in the perpetuation, in manifest symptoms, of an inward mental instability?"

"II. *Chest (lung) condition*

"This is a very large and difficult class. But here we *can* get a coherent pathological concept regarding the aetiology and course of the disorders found in many returned soldiers.

"In pre-X-ray days the term '*pulmonary fibrosis*' was used to identify certain fibrotic conditions of the lungs of an exceedingly chronic type, associated with tuberculosis, and with certain trades and occupations—or found as a sequel to gross inflammatory disease such as pneumonia or sepsis, but always as a *gross pathological lesion*.

"With the development of radiology there was introduced a further concept of '*fibrosis*' as a disease entity. The sub-epithelial structures of the bronchiola may (the theory postulates) be so thickened, as a result of various recurring irritations to the bronchial mucous membrane or sub-acute infections, as to produce a morbid condition recognisable as a clinical entity. This condition was described under various names, the designations being based on one or other of the most striking or prominent of the aetiological or clinical features: '*chronic bronchitis*', '*relapsing bronchitis*', '*bronchial asthma*', '*emphysema*', '*chronic bronchial catarrh*', or frankly '*pulmonary fibrosis*'. The radiologists reported that they could see in these cases, and recognised on the X-ray plate and the screen, a definite and characteristic shadow picture of the lungs and bronchial tree; and moreover could distinguish it from the picture given in early tuberculosis.

"The war (and in particular the aftermath of the war) brought about a tremendous extension of this line of clinical pathological and radiological investigation; and led to the integration of the various symptoms and physical signs into a definite disease entity. The concept was, indeed, pushed too far. In particular the radiologists began to see '*pulmonary fibrosis*' in every A.I.F. chest submitted to them. Few of these cases are of a kind that die directly from the lung condition; and, if they do, post-mortem study of pension cases is uncommon. The unconfirmed *ipse dixit* of the radiologist has therefore been accepted with almost unquestioning readiness.

"The evidence of time, and a more scientific attitude toward the significance of shadow pictures, have led to considerable modification of this pathological concept. But at the same time, without doubt it does provide the basis for a clear line of thought and action in a large and difficult class of cases.

"Pulmonary fibrosis in returned soldiers. Among the men who served in the war, and who were not necessarily invalided or even subject to serious illness on service, there are found now many who present for treatment and pensioning with symptoms pointing to some indefinite pulmonary disorder, not, however, having the features characteristic of a neurosis; and in whom examination reveals definite physical signs, in particular, *prolonged expiration*. In these men the radiologist claims to recognise a constant radiological picture that he looks on as distinctive and as pathological. In a proportion of them a history of gassing may be found; others have a history of repeated attacks of minor pulmonary infection. Such a history, indeed, may be presumed of a large number of soldiers who served in France; or even among those who, without service at the front, remained for any length of time in the camps in Australia, Egypt and England. Such cases are now accepted as a war disability. The pathological basis for this acceptance rests on the theory that the conditions found—as noted above—represent the final, or the penultimate stage, in a sequence of events in the lungs, whose course is visualised somewhat as follows.

"A bronchitis, or 'bronchial catarrh' which may have involved only the mucous membrane, and in some minor degree the peribronchial tissues, might have resolved in one of two ways. It may have resolved completely, without permanent effect of any kind on the peribronchial tissue. In this case there would be no further ill effect; but, if the condition did not so resolve, one of two things happened. Either

"(1) the peribronchial thickening that remained was of so slight a nature as to produce no further trouble, and in course of time in great measure cleared up; or

"(2) by reason of further repeated insults in the way (for example) of slight gassings; exposure to dust laden atmosphere; infections; hardships; upper respiratory tract troubles; and so forth, it progressed to a condition of permanent fibrotic thickening of the peribronchial and vascular tissues, with a consequential diminished vitality, and increased vulnerability to infection of the bronchial mucous membrane.

"This condition is made manifest by recurring attacks of bronchial catarrh or chronic bronchitis; and goes on to further pathological developments and clinical disorder in the form of emphysema and so forth. The degree and nature of these is determined by the inherent quality of the lung tissue; by the concomitance of various constitutional poisons (e.g. syphilis); by vascular degeneration; or by an unphysiological mode of life.

"Whatever may be the cause, there is to-day a large 'block' of chest cases which are classed as *fibrosis of the lungs*; in whom the pathological condition is regarded as being a minor manifestation of that gross 'fibrosis' to which the term was once confined.

"From the pensions point of view the question of *entitlement* is based as much on evidence of the *continuity of the manifestations of*

disease as on their *occurrence on service*. The difficulties involved in this position are felt with special force in connection with the 'disease' described above.

"*General chronic pulmonary disorders* of pensionable kind may be due to—

"(1) Acute bronchial infections on service; or

"(2) acute bronchitis, following gassing, that goes on to fibrosis; or

"(3) upper respiratory tract infections incurred on service.

"III. *Chronic rheumatism (the rheumatic syndrome)*

"Acute rheumatism causes little more difficulty in respect of after care than (for example) scarlet fever or empyema. Its occurrence is commonly a matter of definite record, its sequels are clear cut. In some cases compliance with the requirements of the term 'occurrence', as signifying *first occurrence*, may present difficulties. Moreover, the aetiological relationship—if any—between '*acute rheumatism*' and '*chronic rheumatism*'; and between '*rheumatism*' and other forms of arthritis, acute or chronic in character, and various other kinds of pain or disability centring in the skeletal or muscular systems, are as difficult of assessment in war as in peace.

"It is the chronic forms of '*rheumatism*' or presumed '*rheumatic*' manifestations that cause the real trouble in attribution owing to the fact that *we know little of their nature and hardly anything of their real 'cause'*.

"The majority of pension claims labelled as '*rheumatism*' are due not to *arthritis* or *spondylitis* (though the latter is more common than was once thought). Focal infection was at one time given undue importance as an aetiological factor in '*rheumatism*'.

"IV. *Gastric and duodenal ulcers*

"These provide a serious problem for the same reason—their cause is unknown, their course obscure and diagnosis difficult. If the first manifestation or first symptom of the disease, or of tendency to it, occurred on service, then such manifestation has to be accepted as justifying a pension claim.¹⁹

"*Appendicitis* and *cholecystitis* provide difficult problems.

"V. '*Nervous conditions*'

"Apart from *organic disease* of the central nervous system, the problem associated with which may be easy (e.g. a stroke) or very difficult (e.g. multiple sclerosis or tabes), it is the *psychotic syndrome* in its multifarious manifestations, that calls for special study; and this syndrome is in essence, in almost every instance, the manifestation of an *anxiety state*. Having *arisen* as a war experience in some form of the psychic syndrome, in a man with inferior nervous 'makeup' (inherited or acquired), it is *perpetuated* in the man's post-war history, through the necessity for *reinstating himself against competition*, by the desire to *obtain a larger pension*, and so forth.

"Most of the manifestations of the anxiety state appear now as superimposed on some organic disease, or structural injury.

"*Epilepsy* appears in some instances to have developed on war service, but whether as a consequence of it, and, if so, why, is quite obscure. In this disease, again, the cause is unknown.

"VI. *Sundry*

¹⁹ This principle was not accepted by all the Committee.

"Renal disease presents no special pensioning problems; but the fact that *we do not know the cause of idiopathic Bright's disease*, and that its earliest manifestations are very obscure, together with the fact of the occurrence of *trench nephritis* as a definite war disease, undeniable though aetiologically obscure, has led to much difficulty in individual decisions.

"Disease of the upper respiratory tract ('U.R.T.I.') and middle ear disease present a very important group of problems, and provide a large 'block' of pensionings."

The Returned Soldiers were dissatisfied by difficulties and delays under this system in proving attribution to war service and in 1929 Sir Neville Howse, then Minister for Repatriation, brought in a bill which was passed on 25th March creating Appeal Tribunals—independent bodies expressly for the purpose of hearing appeals against the Commission's decisions on the two important aspects—entitlement and assessment. On 1st June 1929 the Government appointed "Entitlement" and "Assessment" Appeal Tribunals.²⁰ The function of the former was to hear appeals against decisions of the Repatriation Commission that the death or incapacity of the member of the forces has not resulted from any occurrence happening during the period he was a member of the forces, or from his employment in connection with naval or military preparations or operations; the duty of the Assessment Appeal Tribunal was to decide appeals against the Commission's assessment of the rates of pensions.

The Act or Amending Acts laid down that the Appeal Tribunals should not

be bound by any rules of evidence but shall act according to substantial justice and the merits of the case and shall give to an appellant the benefit of the doubt.

It also provided that if the soldier appealing, or his representative, made out a *prima facie* case

that the incapacity from which he is suffering or from which he has died was caused or aggravated by war service,

²⁰ An Entitlement Appeal Tribunal consists of a lawyer as Chairman, with two other members, who must be returned soldiers, one of them selected from names submitted by returned soldier associations. It can obtain the opinion of specialists on the case. The appellant may attend. The Assessment Appeal Tribunals comprise a lawyer as Chairman and two medical assessors, selected as required from a panel. The appellant must attend and submit to medical examination. He may be represented by an advocate who must not be a lawyer. The Tribunals can (a) summon witnesses, (b) take evidence on oath, and (c) require the production of documents.

the onus would then, in effect, lie on the Commission to *prove the contrary*. There was thus created a problem that has not yet been solved—and indeed is unsolvable.

The creation of the Appeal Tribunals radically changed not only the procedure but the principles that hitherto had held and governed the adjudication of pension rights. In effect, it removed the ultimate responsibility and authority from the medical to the legal profession. The Medical Advisory Committee still functioned actively, but in August 1932 it made the following recommendation to the Commission:

It is now approximately fourteen years since the Armistice, and it should be pointed out, first, that any war service disability would have made itself manifest, in some recognisable degree, during that long period. Secondly, that with advancing years the ex-soldier sections of the community will be liable to the same ailments that afflict sections of the civil community, in the same age periods.

It has been found practicable, during the last five years, in Great Britain for experienced medical officers to discriminate satisfactorily between disabilities caused by war service, and the disabilities that occur in civil life, in association with advancing years. It must be emphasised that right judgment in the matter of "claims", made at a time remote from the period of actual war service, depends predominantly on medical knowledge and experience of diseases as they occur, ordinarily, in the later years of adult life among members of the community who have seen no war service.

The Committee therefore recommended a change of procedure somewhat similar to that which had taken place in Great Britain five years earlier

(i) That all new claims in respect of disablement should still be received and considered by the Repatriation Commission;

(ii) That after a date to be fixed, for instance 30th June 1933, the simplified procedure as practised by the British Ministry of Pensions, be adapted to the Commonwealth, namely—

- (a) That the applicant supplies evidence in support of his claim;
- (b) That this evidence, taken in conjunction with the "medical history" of the applicant, be considered by the Department;
- (c) If the disability appears to be, reasonably, a late manifestation of "an occurrence on war service", the applicant should be medically examined;
- (d) For acceptance of the claim, the disability must be found to be clearly and definitely due to war service;
- (e) If the claim is not accepted by the Department, the applicant should have the right of appeal to a Board, specially constituted on the lines laid down by the British Ministry of Pensions;
- (f) That the decision of this Board should be final, as laid down in the procedure in Great Britain.

The Principal Medical Officer of the Commission had, in 1929, presented to it a strong report pointing out that in purely medical questions the Entitlement Appeal Tribunal had been reversing many carefully considered decisions of the Commission's medical advisers.

Under sound methods (he said) the cost of war pensions and hospitalisation may be expected to increase for at least 12—15 years to come, but it is impossible even to hazard a guess concerning the future whilst war service is too easily presumed to have been the cause of existing ill-health and old age—"presumptions that are untruthful and according to our consultants physically impossible" and which set up a "standard of subterfuge".²¹

The recommendations of the medical advisers were not, however, adopted, and the Committee itself ceased to exist. As a permanent appeal board it was unworkable. For purely medical questions as well as purely legal the Entitlement Appeal Tribunal—in effect a legal body—is now the final court of appeal.

The question whether war service must not be presumed to be *per se* the cause of "old age", was brought up by the Returned Soldier Associations in an agitation that lasted for several years over the question of the "burnt out soldier".

**The hypothesis
of the "burnt
out soldier"**

No precise date can be fixed for the birth of this arresting slogan, which seems to have originated in Canada. From early in A.I.F. pensions history, however, the belief was more or less clearly held that—quite apart from specific conditions of disease—the physical and mental experiences of the war brought about, in the great majority of soldiers, a constitutional deterioration which made him both liable to the onset of specific disease states, and also to premature ageing ("senile decay").

The campaigns for attribution of various specific types of disease²² were in part the effect, in part the creators, of the hypothesis.

²¹ The quotations are from remarks by the President of the United States who dramatically intervened to veto a bill which had been passed by both houses of Congress and by which certain diseases (mainly mental and tubercular) were, if arising before 1925, presumed to be due to war service. The voting on the bill was afterwards reversed.

²² Among the diseases for which "undue prevalence" among returned soldiers has at some time been affirmed and made the basis of claim for "the benefit of the doubt" the following are prominent: pulmonary tuberculosis, sub-acute bacterial endocarditis, degeneration of coronary arteries, chronic nephritis, peptic ulcer, arterial degeneration, tabes dorsalis, encephalitis, major psychoses, suicide. Few diseases,

The spokesmen of the returned soldiers took it up and in the early 1930's in New Zealand, Canada, U.S.A., Australia and even Great Britain, a determined move was begun to obtain recognition for the avowedly unauthenticated belief in the handicap of war experience *per se* on the chances of the soldier in the battle of life.

The medical profession was unable to refute or to prove this contention. No body of morbidity experience adequate to such a decision existed, nor had the matter been held by Parliament worth exact investigation. The statistical methods of the Commission made its records useless for a routine enquiry. Individual medical officers initiated personal researches which led them to question the validity of the hypothesis.²³

indeed, have not at some time been pilloried. An epidemic of operations for "deflected septum" occurred in Queensland in 1920-21. Ear, eye and skin diseases have had their vogue. Over and above all is the claim that participation in the war had an inimical and far reaching influence on the "nervous system" which might lie dormant for many years, and determine a "breakdown" under adverse circumstances.

²³ Thus the Senior Medical Officer to the Commission in New South Wales, Maj. C. K. Parkinson, made a prolonged and exceedingly careful study of the subject discriminating certain specific disease entities—the only procedure apart from statistics whereby the problem could be attacked—by making use of returns obtained by the Department of deaths of returned soldiers throughout the State, gathered from every possible source. His general conclusion was:

"It is my belief that apart from actual woundings and exposure to certain infections, army training and service conditions generally were, on balance, favourable to the fitness and health of soldiers. I do not believe that exposure to wet, cold, and heat, infection, and 'stress and strain' in general, produced serious ill effects.

"My experience over the past twenty years has been such as to prove beyond all possible doubt that the propagation of statements as to early death and the incidence of disease in ex-soldiers has a most serious and widespread effect in increasing invalidity, incapacity, and unhappiness among ex-soldiers."

In New Zealand Mr. Cayley Alexander working on figures of deaths of ex-soldiers obtained through the Commissioner of Pensions, the Government Statistician and the Under Secretary of the Department of Internal Affairs obtained results which he held to prove that the average age of death of New Zealand ex-soldiers as compared with that of civilians showed the following results:

Average ages at death

Year	Civilians	Ex-Soldiers	Difference in age in years
1935-6	62.5	51.9	10.6
1936-7	58.06	53.97	4.09
1937-8	60.09	54.7	5.37
1938-9	59.14	53.2	5.94
1939-40	57.56	54.6	2.96

The source of the figures were (1) Soldiers' relatives who applied for benefit of burial for deceased soldiers from the Commissioner of Pensions. (2) Certain information obtained by the Government Statistician which discriminated Returned Soldiers among the deaths reported from the civil population. (3) The total record of deaths in New Zealand. From the aggregate of ages thus obtained the above calculation was made.

The New Zealand census of 1936, in an enquiry similar to that made in the Australian census of 1933, is stated to have revealed the age at death of the

To settle the question, if possible, the Minister for Repatriation, Hon. C. W. C. Marr, arranged through the Commonwealth Statistician to endeavour to discover in the census of 1933 the total number of members of the A.I.F. who had served abroad and were then living. It was thus hoped to ascertain the comparative age at death of the ex-soldier and the civilian of the same age group. The calculation required a further complete individual count of the personal records of every Australian soldier and nurse who served abroad in order to ascertain the exact number of *individuals* who returned as distinct from the number who disembarked. The result is stated in the Statistician's Report:

**The census
of 1933**

Although it was not possible from these data to construct a life table comparable to the Australian Life Tables of 1932-1934, it was possible to make some comparison between the two experiences—national and returned soldiers. It was ascertained, as a result of these calculations, that the mortality amongst returned soldiers since discharge exceeds that of a body of males of the same age constitution drawn from the general population by about 13 per cent.

The result of this investigation is undoubtedly of great importance. Presuming the correctness of the deduction arrived at from the data it would seem justifiable to presume that the expectation of life of the returned soldier and the civilian at that time were as 7 to 8, and the advantage to the civilian approximately 4 years. In other words, the general probability that a mortal disease occurring in the returned soldier is "due to or aggravated by war service" would be increased by some 10 per cent., and the extent to which he should "benefit by the doubt" could be assessed on that percentage. But the census cannot be said to decide the question whether the reduced expectation of life is due to effect of war service on the general constitution (as is claimed) or to the existence among

returned soldier as 6½ years younger than that of the civil population of approximately corresponding age groups.

A paper on "The Mortality Experience of the Australian Mutual Provident Society 1902-1922", states:

"Many people anticipated that a large proportion of those who went on active service would return with their health permanently impaired. It is found, however, that the mortality in years 1920 to 1922 among persons aged from 23 to 57, which group includes almost all the returned soldiers who are policyholders, is much lighter than the mortality at the same ages in the years 1902-1914. It does not appear, therefore, that the vitality of the large body of policyholders who returned from the war has been seriously impaired by their experiences abroad."

returned soldiers of the accepted effects of war experience.²⁴ Not "paths of glory" only lead year by year to the grave.

Inasmuch as these figures include all the soldiers who suffered recognised war-damage and were in receipt of pensions, they cannot be considered remarkable. On the other hand they represent the experience of a body of men *who unquestionably must be regarded as physically select* in view of the fact that they had been passed as "fit" by medical examination.²⁵

On the ground of the census figures the Commonwealth Government introduced legislation establishing a scheme of "service pensions" whereby the returned soldiers (including, of course, nurses) were enabled to obtain the benefits of age or invalid allowances at an age and under conditions more favourable than the rest of the community.²⁶ Under this Act of 1936 eligibility for such service pension could be established on three grounds: (a) Age of 60 or upwards—confined to men who had served in a theatre of war; (b) permanent unemployability (with the same condition)—a pension was also payable to his wife and children up to four in number; (c) pulmonary tuberculosis "whether the applicant served in a theatre of war or not", a pension here, too, being payable to his dependants.

The inclusion of pulmonary tuberculosis to the exclusion of all other specific conditions can only be justified on grounds which are social and political rather than medical.

It cannot be questioned but that this legislation was in accord with the general consensus of opinion of the community and with the views of the medical profession. Its most important effect from the point of view of pensioning was to diminish the necessity for the struggle to establish (or refute) a claim of

²⁴ With the assistance of the Editor of *Reveille* and the Repatriation Commission an enquiry on a small scale was made into the age at death of the returned soldier as against that of the male population of corresponding age groups. Figures obtained by the Commission from various sources, in particular claims for funeral benefits, in a total of 5,000 returned soldier deaths during the years 1940 and 1941 indicated that the average age at death of the soldier was between 55 and 56 years as compared with an average in the civil population (as supplied by the Department of Census and Statistics) of between 58 and 59.

²⁵ The claim that the recruit's examination ensures that the enlisted soldier is in actuarial terms a perfect life is, of course, absurd.

²⁶ Since December 1941 some South African War veterans have been included.

attribution when such effort must result in a guess falsely supposed and stated to be a scientific "proof".

The scope of the pension has since been extended and the right of appeal granted and extensively availed of. As stated by the Commission in its Annual Report for 1936:

The Commission is of opinion that the scheme is being administered in a sympathetic way, and that the most liberal construction has been placed on the restrictive provisions of the Act in accordance with what it believes to be the intention and desire of the Government as expressed during the debate when the amending Bill was before Parliament.

The figures given in the Commission's Reports show that the unregulated extension of the system, which history has shown to be so grave a danger elsewhere,²⁷ has been wholly avoided in Australia. Indeed it may be proposed that, with due safeguards against undue exploitation of this procedure, the service pension might be made the implement for eliminating all that unhappy structure of "overhead" in claims and appeals which have been so great a feature of Australian pensioning.

From the experiences and conditions recorded in this chapter it is clear that after the lapse of a period necessarily indefinite, and varying with individual diseases and cases, but which cannot with propriety be extended much beyond 15-20 years, the possibility of stating in respect of a developing disease whether on medical grounds any, and if so what percentage, of its morbid content should be attributed to war experiences becomes in the majority of instances *uncertain and conjectural to a degree that puts the question outside the scope of scientific medicine*. Failing a clear war and post-war history, the propriety of admission to the benefit of pension depends in such case not so much on the detection of a "doubt" as on the possibility of creating one. Such action, if designed to offset an economic or social handicap, may be ethically and nationally legitimate, even admirable; but it is not medicine and should not be founded on a pseudo-medical decision.

TREATMENT

The second prime division of medical responsibility toward

²⁷ The acceptance of responsibility to an almost unlimited extent by the United States of America and its embodiment in legislation as "service pensions" has involved the U.S.A. in a coil, economic and moral, which is one of the most amazing social phenomena of modern times.

the war-damaged soldier is the 'medical treatment to which, under the terms of the Act, he is entitled. Here too he has usually to establish attribution to "some occurrence happening on service" though in a few instances (in particular pulmonary tuberculosis) he has only to establish the fact of service.

If the pensioning function of the Repatriation Commission seems (as indicated by the statistics) to dwarf in significance that of medical treatment, it may well be doubted whether, as a contribution to the happiness and welfare of the soldier and to the solution of the problem of "rehabilitation", the influence of the medical treatment was not the greater.

It is possible here, however, only to glance at the subject. The treatment comprised, first, general hospital treatment of more serious cases and convalescent service to the recovered or recovering soldier; second, reparative treatment calculated to promote the soldier's recovery or fit him for his old occupation, or for some new one made necessary by his disablement; third, the provision of artificial replacements, especially artificial limbs.

**The Repatriation
Hospitals**

For these purposes the Commission took over either during or after the war (*a*) the whole of the hospital organisation built up under the Defence Department, an account of which has been given; (*b*) the linking activities built up under the various voluntary bodies, including most of those of the Red Cross, which were concerned more particularly with fitting the soldier to resume a place in civil life; (*c*) the artificial limb factories established by the Defence Department.

All these were in a very great measure reorganised and either consolidated or extended. The extensive system of Auxiliaries was gradually concentrated in the General Hospitals, and these were developed for treatment and diagnosis on the most up-to-date and effective lines; in particular the surgical side was brought up-to-date. Special hospitals and sanatoria were also either taken over or established for the treatment of tubercular and mental cases.

A special development was in the creation of convalescent "farms", which extended the scope of the reparative treatment

to reparative occupations, and of "hostels" for permanently incurable cases such as fractures of the spine.

The subjoined table shows the number of patients treated each year in these several types of institution. The General

List of hospitals etc. Hospital treatment of serious cases has gradually become centralised in a General Hospital in each State, as follows:—

Queensland, Repatriation General Hospital, Rosemount; New South Wales, Prince of Wales Hospital, Randwick; Victoria, at Caulfield; South Australia, at Keswick; Western Australia, at Perth; Tasmania, at Hobart. Special arrangements are also made for treatment in civilian hospitals in country towns.²⁸ The Red Cross Society maintained from the outset a close co-operation with the Commission and in 1922 maintained over twenty institutions most of which had been created in co-operation with the medical department of defence. The terms of co-operation were of the most varied kind as shown in the following table. Greater efficiency would probably have been achieved by a more exact and businesslike demarcation of voluntary and official responsibility. Ultimately the institutions were brought under the Commission itself, the Society however continuing to provide amusements and comforts.

The question of "Voluntary" participation, by such bodies as the Red Cross and the Legacy Clubs in the provision of accommodation, care, and comfort for the war-damaged soldier is one of no little complexity, and opens up elemental issues in social co-operation. The "human touch" which it permits is—as has elsewhere been illustrated—often strongly offset by the drawbacks of inconsequence and irresponsibility. Reliance on such provision was apt to result in waste and overlapping, necessitating official intervention. But the history of this war and of its aftermath is emphatic in its evidence that the "human touch" should be sought by every means, provided that these ensure ingenuous and disinterested social co-operation, and the Returned Soldiers have themselves strongly supported the exploitation of personal non-bureaucratic activities, *e.g.* in the admirable War Veterans' Homes.

²⁸ By special arrangement until the war of 1939 the Repatriation Commission undertook the treatment of all military cases for the Army Department.

TOTAL OF IN-PATIENTS UNDER TREATMENT AT END OF EACH YEAR.

Year	General Hospitals	Sanatoria patients	Advanced T.B.	Mental patients	Anzac Hostel	Anzac Farms	Country hospitals, etc.	Convalescent homes	Convalescent farms	Others	Total
1922	954	453	—	316	127	42	34	132	141	335	2,534
1932	580	136	104	579	47	—	—	—	—	—	1,446
1941	1,031	195	196	520	31	—	47	—	—	—	2,020

CLASSIFICATION OF CASES (IN- AND OUT-PATIENTS) TREATED DURING THE YEAR.

Year	Diabetes	Eye, Ear, etc.	Gas	G.S.W.	Heart	Kidneys	Malaria	Mental	Pulmonary	Rheumatism	Trench feet, etc.	T.B.	War neuroses, etc.	Others	Totals
1926	44	2,088	729	4,059	1,236	610	522	584	3,109	1,116	69	2,878	1,570	4,128	22,742
1933	114	2,951	663	5,830	2,289	654	320	938	6,526	2,434	133	2,879	3,377	6,442	35,550
1939	98	3,289	662	8,352	3,541	715	179	789	9,348	3,701	172	4,326	4,891	9,094	49,157

The average number of attendances for treatment of out-patients during each of the years 1932-41 was 148,000

The average number of in-patients at the end of each of the years 1922-41 was 1,700.

RED CROSS HOMES, ETC., 1922

"The Red Cross institutions have lessened in number, but the following were utilised during the year, and the Department paid for the maintenance of its patients"•(Report of the Repatriation Commission for the year ending 30th June 1922).

State	Institution	Location	Function	Bed Capacity	Other particulars
New South Wales	Russell Lea	Five Dock	Neurosis	52	Commonwealth property conducted by the Society for the Department.
New South Wales	Mowbray Park	Picton	Convalescent farm	22	
New South Wales	Convalescent farm	Exeter	Convalescent farm	30	Controlled by the Society, which owns property and equipment.
New South Wales	The Mill	Moss Vale	Convalescent farm	20	
New South Wales	Graythwaite	North Sydney	Anzac Hostel	74	Part Commonwealth and part State. Property furnished and conducted by Red Cross Society. Conducted by the Society, which owns property and equipment.
New South Wales	Bodington	Wentworth Falls	Sanatorium	90	
New South Wales	Lady Davidson Home	Turramurra	Sanatorium	99	Commonwealth property conducted by the Society for the Department.
New South Wales	Woodville	Randwick	Advanced T.Bs.	18	
New South Wales	Shuna	Leura	Sanatorium	7	Controlled by the Society, which owns property and equipment.
New South Wales	Red Cross War Chest Farm Colony	Beelbanger	Anzac Farm	37	
Victoria	Anzac Red Cross Farm	Janefield	Anzac Farm	25	

RED CROSS HOMES, ETC., 1922—*continued.*

State	Institution	Location	Function	Bed Capacity	Other particulars
Victoria	Convalescent home	Bendigo	Convalescent home	27	Controlled by the Society, which owns property and equipment.
Victoria	Convalescent home	Healesville	Convalescent home	20	
Victoria	Convalescent home	Sassafras	Convalescent home	10	
Queensland ..	Ardoyne	Corinda	Advanced T.Bs.	26	
Queensland ..	Simla	Too-woomba	Convalescent home	22	
Queensland ..	Rakeevan	Graceville	Convalescent home	40	
Queensland ..	Grange Hill	Brisbane	Convalescent home	30	Property owned by the Society, but leased and conducted by the Department.
South Australia ..	Lady Galway Home	Henley Beach	Convalescent home	60	
Western Australia ..	Convalescent farm	Kalamunda	Convalescent farm	50	
Tasmania ..	Ellesmere	Jericho	Convalescent home	12	

In addition, the Society erected a ward at the Talbot Colony for epileptics in Victoria, permitting of the segregation of ex-soldier patients.

After the war the staff of the Repatriation Hospitals was drawn exclusively from returned soldiers, so long as it was possible to do so. Both medical officers and nurses had however to be supplemented as years went on from the civil professions, though up till the present the senior and specialist physicians and surgeons and superintendents have been returned soldiers.

Staff

The staff is organised in whole-time personnel and visiting specialists. The full control of the hospital is vested under the Commission in the Superintendent under whom the rest of the staff, permanent and visiting, carry out their duties. The annual reports of the Commission do not give details for each year of the Commission Staff. For the year 1936, when the access of patients through the institution of the Service Pension Scheme considerably increased the responsibility for treatment, the staff—as stated in the Annual Report—was as follows:

Headquarters and Branch Offices

Commissioners	3
Secretary to Commission	1
Deputy Commissioners	6
Medical staff	38
Clerical staff	404
Typistes, assistants, and telephonists	142
Messengers, (boys)	40
Watchmen and cleaners	14
	<hr/>
	648

Medical Institutions

Medical staff	20
Nursing staff	185
Supply officers and clerks, and storemen	55
Typistes and telephonists	15
Messengers (boys)	7
Dispensers and assistants	21
Massage staff	14
Pathological and X-ray assistants	11
Gardeners	15
Laundry staff and seamstresses	29
Orderlies	148
Household workers	138
Cooks and assistants, and butchers	30
Miscellaneous (canvas workers, electricians, fitters, firemen, motor car drivers, and painters)	11
	<hr/>
	699

Artificial Limb Factories

Managers and assistant managers	8
Clerks and storemen	8
Artisans (limb and appliance makers and boot-makers, etc.)	52
	<hr/>
	68

TOTAL 1,415

Visiting consultants. All the specialist work of the hospitals is carried out by a system of paid visiting “specialists”, representing “medical” and “surgical” practice and the various

"specialties".²⁹ For these positions returned soldiers of the highest standing in the profession have been employed from the outset and in many instances have carried out their duties uninterruptedly till the present. The senior members of the nursing staff also have in many instances served the returned soldier throughout the peace as they did in the war.

Surgeons, physicians, and specialists with the accessory services, found themselves faced with problems not less diverse than those in civil life. The medical problems, **Treatment and service** indeed, are essentially those of civil life, and speaking broadly the same may be said of the medical specialties,³⁰ eye, ear, nose, throat, skin, bacteriology, radiology, etc.

The surgeons. The work of the surgeons, as was noted in *Chapter VI*, has presented many problems differing greatly from those of civil life. But especially noteworthy is the dominant importance of orthopaedic or reparative surgery. A "Medical Review" in the Commission's 1922 Report says:

Latterly the type of cases coming up for operation may be divided into three classes:

(a) *Cases of bone sepsis, whose wounds had healed but broke down when the limb was used.* . . .

(b) *General orthopaedic cases*—Particularly cases of complete division of nerves, ununited fractures, and stiff joints in men who were discharged a short time after their return to Australia with a hopeless prognosis. In many of these cases modern methods were able to lead to improvement or recovery.

(c) *Men who had severe wounds generally leading to extensive scarring, involving mostly the muscles.* . . .

Medical cases. The immense field of therapeutics provided by the after treatment of the A.I.F. may be judged from the clinical analysis of pensioned men given in the next chapter. Malaria, amoebiasis, and bilharzia have already been dealt with. Some of the most engrossing problems were contained in the group, nephritis. A number of these, deriving from the trench

²⁹ These visit the hospital twice a week and see cases as required by the Superintendent. No surgical work is permitted to the resident medical officers. The physicians are paid by the visit (two to three guineas) and this obtains for the eye, ear, nose and throat, radiological and other "specialties". Surgeons receive a salary of approximately £400 per annum. Special visits are paid for at the rate of £3 3s. per visit.

³⁰ An exception may be instanced in the late development of corneal opacity many years after injury from mustard gas, to which attention has been drawn by Mr Granville Waddy.

nephritis of the war period, cleared up under observation and treatment. But a tragic residue remained—made tragic by reason both of their hopeless outlook and their miserable death (which in most cases occurred between 1920 and 1930) and of the fact that, through their intermittent course it was some years before it was recognised that, in common with some other types of chronic disabling disease these men had been left behind in the competition for the "Schedule 2" pension.

The major problems of medical treatment. Two types of disease or disorder prominent in the records of the A.I.F. have dominated the history of the aftermath. These are pulmonary tuberculosis, and those which are comprised under the general title of the moral and mental disorders of conduct. Each has provided problems of extreme complexity.

Pulmonary tuberculosis. The history of this disease in the aftermath of the A.I.F. contains both example and warning. Infectious diseases have three special attributes, (a) a specific pathogenicity on the part of the agent; (b) a distinctive physiological and clinical reaction in the affected individual; (c) a characteristic social reaction in the community.

"Pulmonary tuberculosis" is strongly specific in respect of each of these, and it is an interesting reflection that these far reaching implications are due, in the last analysis—the epigram need not be resisted—to the physical properties of *wax*. It need only be recalled that *the character and method of the pathogenic onslaught*—the slowly progressive caseation and prolonged infectivity and the nature of lesions; *the nature of the clinical syndrome*—the difficulty of cure, the prolonged course and transmissibility; and, at the end of the chain, *the well known social outlook toward the consumptive*⁸¹—all derive chiefly from the waxy covering in which the *tubercle bacillus* envelops itself. And it may also conduce to a common-sense outlook on the vast problem of the "white plague" to reflect that the same waxy covering and pathogenic technique gave to the tubercular Australian soldier his "second schedule pension", and brought about the fact that every returned soldier who develops pulmonary tuberculosis, whether the disease be attributable to war service

⁸¹ See Stallybrass, *Epidemiology*, 1931, (quoting Calmette). The features of the disease due to the *bacillus leprae* have a similar source.

or not, is assured of a weekly pension for himself and corresponding pension for his dependants;³² and that, lastly, the Tubercular Soldiers' Association is the powerful and active body that it is.

Excepting perhaps the "moral and mental" problems of pensioning those associated with the individual experiences of this disease were the most difficult and unsatisfactory in the whole gamut of pensioning.

As concerns *attribution*, until recent years diagnosis was often exceedingly difficult, and it was, moreover, subject to strong social pressure.³³ Proof of attribution has been the more difficult through our ignorance of the exact mechanism and the chronology of the initial onslaught of the bacillus, and to the fact that it may lie dormant for many years.³⁴ The influence of its intractability to treatment and the social insulation of the tubercular person created problems which called for a varied line of action.

Sanatorium treatment. Entirely familiar to the present generation the "sanatorium" method for the disposal and treatment of cases of pulmonary tuberculosis was a novel, even a revolutionary breakaway from orthodox methods in the memory of many men in active practice to-day. The Commission, excellently advised and served by its medical staff and consultants, undertook one of the most exact and impressive campaigns in the history of tuberculosis in Australia. The admirable provision made for sanatoria by the Defence Department was taken over and gradually extended. The most approved modern methods of treatment have been exploited under circumstances at least as good as any to be found in civil practice. Close individual attention was given by medical

³² Pension for tuberculosis is ensured, whether the soldier recovers or not, for life.

³³ The most unhappy memory of a short service by the writer as a specialist physician to the Repatriation Commission is that of the moral conflict between professional probity and the desire to serve the soldier whose only claim to a special pension was the acceptance of his pulmonary disease as due to the presence of the tubercle bacillus. No greater boon to social medicine can be cited of recent years than the conquest of this diagnostic problem by radiography and by studies such as those made by Dr. Reginald Webster, under grant from the Australian National Health Council, 1941-2. See Monograph, *Studies in Tuberculosis*, Sydney, Aust. Med. Pub. Coy., 1942.

³⁴ "Every man has at his death a healed tubercular lesion." (Cf. papers by M. J. Holmes and R. E. Richards, Aust. Nat. Health and Med. Research Council, Canberra, 1939.)

officers of outstanding ability and close record of every individual case has been kept.³⁵

The "second schedule" pension. In 1922 legal authority was created for payment of a "special rate pension" of £5-£8 a fortnight to soldiers who through military service had become totally incapacitated through (i) loss of vision, (ii) pulmonary tuberculosis, (iii) *permanently* through "other causes". The rate for dependants was not affected. Though it cannot be said that the sole or even the chief purpose and impetus to this pension was medical, one element in its intention was to enable the tubercular soldier to exploit to the utmost the possibilities of treatment calculated to restore him to health—and, especially, that men discharged from sanatoria potentially at least recovered or recoverable should not sustain a setback through financial stringency. The comparative incidence of the "special pension" and the numbers involved may be gained from the following figures:

Blinded soldiers. From 106 in 1922, the number had risen to 130 in 1927, to 132 in 1932, to 140 in 1937, and in 1941 stood at 154.

Tubercular soldiers. The corresponding progressive figures for this disability were—1922, 520; 1927, 1,047; 1932, 1,012; 1937, 916; 1941, 716. From 1936 a "Class B special pension" of £5 a fortnight has been paid, the number averaging 350.

"Other causes". The corresponding figures for the various conditions coming under this heading are—184; 960; 1,480; 2,075; 2,354.

Results. The records of the Commission do not permit the presentation of complete statistics of this disease in the A.I.F. Of the soldiers discharged from the Army 1,969 were suffering from diagnosed tuberculosis, of whom 1,382 had served in the line; 288 died prior to discharge. The records of the Repatriation Commission do not permit a statement as to the number who have died while in receipt of a pension.

In the absence of comparable figures no exact appreciation of the results of this very extensive and original campaign can be given. But, (as has been pointed out by Professor Major Greenwood) endeavour to obtain statistical proof may be less useful than the methods of general observation if undertaken

³⁵ In particular the method of treatment and "re-enablement" by means of graduated exercises was explored. Patients were placed in six progressive grades much on the lines of the "categories" in the Command Depots, and their treatment and their lives ordered in conformity.

by observers capable of appreciating the problem and the facts available. The authoritative consensus of opinion of the responsible officers of the Repatriation Commission engaged in administration or treatment, however, inclines strongly to the conviction that, whatever advantage the special pension may have held in increased comfort and freedom from anxiety, it has been disappointing in results as an alternative to complete sanatorium treatment. A note of the medical collator states:

- The conclusion of all officers concerned in the treatment of tuberculosis cases is that more depends on the man than on the disease. Even when the special pension was made permanent so that the incentive to recovery was not diminished by the knowledge that it involved loss of pension, it would seem that the impulse still remains to depend on external help rather than to strive toward the possibility of self-help.

But while this view must carry weight it is not less the duty of a historian of the A.I.F. to record the gallant fight put up by very many of its members,³⁶ for whom, happily, the struggle of self-help often brought more solid benefits than the satisfaction that derives from courage and self-respect alone.

Only in a minority of cases is it found that the lessons inculcated in the course of sanatorium treatment are carried out systematically and effectively on return home, and the consensus of opinions of the sanatorium officers is that prognosis in the returned soldiers is worse than in civil life. This might be due (a) to the failure of treatment; (b) to special factors inherent in war-experience detrimental to recovery; (c) to lack of co-operation by the tubercular soldier himself. It is not possible to estimate the relative importance of these factors.³⁷

Since the war the incidence of moral and mental disorders has, in its total influence achieved almost a three to one predominance over that of all other types. It is hardly too

³⁶ It is right that there should be added—with the help and inspiration of no less gallant nurses. To select at random the records of "Ardoyne" Hostel in Queensland—an institution for the treatment of supposedly hopeless cases—were in the early years of the aftermath notable for wholly unexpected recoveries under the inspiration of original and stimulating administration and a "positive" and understanding type of discipline.

³⁷ Enquiry into this question seems worthy of the Government's attention. Indeed, in view of the fact that claims for tuberculosis pension will be even greater in proportion in the present war (since the claim will assuredly be made of complete freedom from the disease at enlistment) it would seem desirable that the immense experience gained by the Repatriation Commission should be focussed on the whole problem.

much to say that the present pension problem is essentially a "moral and mental" one—and this relates both to pensions and to treatment. We find indeed that in these groups *entitlement* and *treatment* are so inextricably inter-related as to make them, in effect, a single medical issue and, only too often, a "vicious circle". "No treatment," an experienced, if pessimistic, medical officer of the department once said, "does a pensioner any good." And the caustic epigram receives some support in a statement by a highly esteemed—if perhaps not unduly sympathetic—consultant.³⁸

There remains the final problem, not of this [the "war worn" ex-soldier] class alone, but of the pensioner as a whole—what is possible in the way of treatment? And the answer is "very little".

Use by this consultant of the term "war worn" is important. It serves to link the moral and mental type under discussion with a group of soldiers who come within the physical sphere of causality. That this condition does form an authentic cause for treatment and for pensioning is shown in the field by the record of observations in an earlier volume—*Volume II*, p. 463—and in the aftermath by studies such as Major McDonald's; by pension figures; and by the consensus of Returned Soldier opinion.

It does not, however, enter into the subject of conduct disorder examined hereunder. As has been said earlier, the salutary warning given in 1916 by Major A. W. Campbell did not save the A.I.F. from the hurt which he so clearly foresaw and the warning is not less necessary to-day.

The most important development in the early years of the Commission, and late years of the military control was the recognition of the importance of segregation and intensive treatment—as was commended by Major Campbell in 1916. The conclusion from observation in both pensioning and treatment seems to be that in the domain of the mind also the *vis medicatrix* is the essential factor in cure—the mind must heal itself and a man must heal his own mind. Only general assistance can be given him in the domain of strictly psychic

³⁸ Major S. F. McDonald, "The Problem of the Pensioner", *Medical Journal of Australia*, 6 Dec. 1930.

treatment. The mental treatment of the returned soldier at least, is not or is seldom in the nature of an operation, on some morbid pathogen (as on a tumour) for which radical extirpation, for example by psycho-analysis, can be undertaken.³⁹

The most important feature of so-called war neurosis in the later years of the aftermath has been that for the most part it is not "war" and is commonly not a "neurosis" in the accepted medical sense, but is a disability of conduct that comes more properly within the field of *morale*. The first few years after the war saw great activity among the psychiatrists in the treatment of the various classical types of neurosis which we have examined elsewhere. Gradually these were cured or became "incurable", and in their place there appeared—especially in the years of the financial depression, 1930-35, a manifestation of the same tendencies which, as we have seen, were at the root of acute "shell-shock". Claims for pension for typical forms of neurosis gave place to what has been called a "neurotic embroidery" to ordinary cases of physical damage. The extent of this is not disclosed by figures since in many it is not classified as an independent item in "entitlement".

The significance of this is very great. A tendency to neurosis has been claimed as the inevitable result of war service in the same nature as those which have been held to influence the supposed constitutional degeneration of the soldier as a social group. In some sense this may be true. But it cannot too strongly be emphasised that—in prevention of nervous disorder as in its cure—the positive aids to self-help will be of greater value to the soldier than any artificial support. And this help must take the form of *enabling him to work, and making it worth his while, morally and economically to do so*.

Colonel C. K. Parkinson, Senior Medical Officer of the Repatriation Commission in Sydney, concludes a strongly critical article with the following inspiring message to the medical profession in Australia:⁴⁰

I should like to turn to the brighter side of the picture. Of the thousands of young men who may now come to enlist, the vast majority

³⁹ It is suggested that this in no way conflicts with the importance and the teaching of psycho-analytic theory as now integrated with wider fields of psychiatry as a general science of psychological medicine

⁴⁰ *Medical Journal of Australia*, 20 Jan. 1940.

will be the equals or the superiors of those who served in the past. They will have, on the average, perhaps an even finer physique and an even greater freedom and independence of spirit. They are no less likeable, and to assist them in time of trial they are blessed with no less humour, though a quickened tempo of their humour makes it harder for an older generation to understand. I can wish you no better fortune than that of having a share in the care of them, and I hope you will make a better job of it than we of that older generation were able to do in the past.

The movement among the returned soldiers for the treatment of men of the A.I.F. on lines which cut athwart the accepted methods of dealing with the "insane" has already been referred to. By the end of **Major disorders of conduct: the "psychoses"** the war 849 men had been invalided to Australia for "mental trouble", 588 with service and 261 with "no service". Of the deaths of such men during the war 112 were from self-inflicted wounds, and 12 from "insanity" 2 specified as "G.P.I."; 29 men died from alcoholism.

The number of "mental cases under restraint"—i.e. independently of those treated at home, and those not accepted as of war causation—was as follows:⁴¹

1924	341	1933	499
1925	347	1934	516
1926	368	1935	522
1927	387	1936	514
1928	329	1937	522
1929	426	1938	520
1930	447	1939	519
1931	455	1940	513
1932	445		

DEATHS OF MEN WITH MAJOR PSYCHOSES

Year	No. of pensioners under treatment	Deaths	Year	No. of pensioners under treatment	Deaths
1922 ..	444	9	1931 ..	859	9
1923 ..	449	12	1932 ..	816	10
1924 ..	468	14	1933 ..	938	7
1925 ..	492	10	1934 ..	771	19
1926 ..	584	14	1935 ..	751	17
1927 ..	627	14	1936 ..	800	19
1928 ..	674	21	1937 ..	809	11
1929 ..	691	9	1938 ..	824	23
1930 ..	789	12	1939 ..	789	5

⁴¹ Until 1939-40 when the system of classification was altered.

The consensus of opinion in medical officers of the Repatriation Department strongly favours the view generally held, that war *per se* cannot be regarded as a "cause" of those various morbid states—diseases—that make up the content of "major" psychiatry. Dr. Parkinson says:

The rate of insanity among ex-soldiers now . . . is not excessive. This statement is made only after careful and protracted enquiry as to the relative incidence of insanity in surviving ex-soldiers and in civilian males of the same age groups. An experience over the past twenty years, which includes examination of practically all ex-soldiers in New South Wales suffering from insanity or major neurotic disorders, convinces me that the essential factor in their disablement is a constitutional psychopathic personality. This conclusion agrees with that reached by those with a similar mature experience in other countries.⁴²

The fact that no excess of major psychoses resulted from the war was not, he contends, due to the elimination of potential psychotics in the medical examination of recruits. In the conditions in which such examinations are usually made, immediate elimination is, indeed, often impossible. A.I.F. experience shows that the most effective method of eliminating "moral and mental" defectives consists in close and skilled observation during the period of training.⁴³

Psychiatric analysis of cases. By the courtesy of Colonel J. K. Adey an enquiry was made in 1935 as to the cases admitted to the Mental Hospital and Receiving House, Royal Park, Victoria. The result is shown in a table on the next page.

The study of mentally afflicted soldiers has probably not added to the scientific knowledge of mental disease. But the

**Conclusion: a
cardinal
advance**

deliberate and characteristic action by the returned soldiers as a body of sane, intelligent and humane men has undoubtedly expedited progress in the "humanisation" of the treatment of the insane. Returned soldiers insisted that, for the A.I.F. at least, the fact that a man has "lost his mind" and requires segregation shall not dehumanise or even de-socialise him. This was effected by (1) insistence that the

⁴² According to Prof. Lorenz (Paper on Neuro-psychiatry, Sixth International Congress on Military Medicine and Pharmacy, 1931) American experience seems to point to some increase in the incidence of insanity; in particular of disorders of the schizo-phrenic type. The prevalence of confusional states was strongly emphasised as well as their curability if treated properly.

⁴³ That this should be combined with expert enquiry into suspicious cases before attestation, and with control of the previous history therein recorded, need scarcely be emphasised.

ANALYSIS OF CASES OF INSANITY IN RETURNED SOLDIERS IN VICTORIA (ACCEPTED AS DUE TO OR AGGRAVATED BY WAR SERVICE) TREATED IN MENTAL HOSPITALS

Disease	In hospital 31.3.35	Percentage of total	Disposed of prior to 31.3.35	Percentage of total
Congenital Mental				
Deficiency				
(a) With epilepsy				
(b) Without epilepsy ..	1	0.43	6	1.29
Insanity with epilepsy	11	4.74	7	1.50
G.P.I.	1	0.43	23	4.94
Gross brain lesion	—	—	9	1.93
Acute delirium	—	—	1	0.21
Confusional insanity	15	6.47	69	14.81
Stupor	—	—	3	0.64
Primary dementia	56	24.14	72	15.45
Mania	5	2.15	35	7.51
Melancholia	27	11.64	63	13.52
Alternating Insanity	8	3.45	3	0.64
Delusional insanity				
(a) Systematised	20	8.62	21	4.51
(b) Non-systematised ..	42	18.10	51	10.95
Volitional insanity				
(a) Impulse	—	—	14	3.01
(b) Obsession	—	—		
(c) Doubt	—	—		
Moral insanity	—	—	2	0.43
Secondary dementia	39	16.81	68	14.59
Other forms of insanity				
Morphomania	—	—	1	0.21
Psychasthenia	7	3.02	6	1.29
Hysteria	—	—	5	1.07
Convalescent	—	—	5	1.07
Not insane	—	—	2	0.43
TOTAL	232	100.00	466	100.00

Cases admitted prior to 31.3.21	60	369
" " after 31.3.21	172	97
	<u>232</u>	<u>466</u>
Disposal	Recovered	308
	Not recovered	87
	Died	63
	Not stated	8
	TOTAL	466

returned soldier mentally ill, though necessarily segregated, should not be subject to the "stigma" at present contained in "notification" as insane;⁴⁴ (2) improvement in the conditions of treatment which had repercussion in civil practice; (3) organised comradely endeavours to provide such mental and physical amenities as should help these sufferers to retain or regain such hold as they may have on the spiritual content, and not the bare fact, of life—or, if awareness has wholly passed, should save them from needless suffering.

The following is a list approximately in chronological order of morbid syndromes that became prominent in Repatriation practice at various times. The common feature of all is scientific uncertainty as to their exact causality.

Some passing problems

"Pulmonary fibrosis". The medical (technical) aspects of this "disease" as noted by Sir Richard Stawell have already been touched on.

"Occult gassing". A most remarkable phenomenon of pathogeny since 1918 has been the birth, burgeoning, efflorescence, and decay of the idea that exposure to an atmosphere containing poison gas, even though without any symptom, might result many years afterwards in pulmonary fibrosis with increasing debility and definite degenerative conditions in the bronchi and lung tissue. The "onus of disproof" of this inherently improbable theory of pathogeny was extraordinarily difficult. Few men reach advanced years without experiencing some susceptibility to bronchial irritation, and there were few members of the A.I.F. who served in France and Belgium but were for months or years liable to breathe an atmosphere in which some modicum of "poison gas" was present. The most obvious gas-effect is bronchial irritation. The result is seen in a wide and determined and quite ingenuous endeavour (which still has strong adherents both within and without the medical profession)⁴⁵ to associate assorted clinical syndromes indicative of pulmonary degeneration with a war-cause little more exact than "service on the Western Front". In the U.S.A. the hypothesis was pushed to an extraordinary extent (See *Chapter II*, and *Volume II, Chapter XXIII*) reflecting a highly subjective attitude to the matter of gassing.

"Gas" and pulmonary tuberculosis. Much more important, but in

⁴⁴ It is necessary to note in this connection that practice differs somewhat in the several States. The attempt to procure the complete segregation of all insane soldiers proved in practice exceedingly difficult, involving, as it did, the mixing of various types in a manner detrimental, even cruel, to the men themselves. For this among other reasons not all the States agreed to it. In N.S.W. the State Lunacy Law requires the certification of all lunatics without exception. At the present time in that State there are 196 "certified" ex-service men in mental hospitals, whose maintenance is a charge on the Repatriation Fund, and for whom various Medical Superintendents are "custodians of the person", and the Deputy-Master in Lunacy of N.S.W. "custodian of the estate".

⁴⁵ Dr. O. S. Hirschfeld of Brisbane, for example, has supplied suggestive case histories. It is however often difficult to confirm a history of gassing and to exclude infection.

the same line of descent, is the world-wide move to associate causally the post-war onset of tuberculosis with gassing. This was indeed a major issue. The medical officers of the Repatriation Commission for a time fell in line, and indeed they agreed that in the early post-war period such association may have been present. The present view is stated by Dr. Maxwell James (*Health Bulletin*, Victorian Department of Public Health, No. 21, 1930, p. 689):

"The gassed man is undoubtedly disabled, but he is in much the same category as the man with a healed gun-shot wound—injured, but not diseased . . . the balance of opinion in the medical world at the present moment is that this disability is most unlikely to develop into tuberculosis, and that the danger period is now definitely over."

Arterial degeneration and hyperpiesia. In the early thirties a determined and highly emotional endeavour was made to create the impression that the returned soldiers were being "wiped out" by coronary thrombosis, and arterio-sclerosis and that hyperpiesia (as "blood pressure") was contributing large blocks of attributable disability. The essence of these conditions is that their "cause" is still in doubt. It can, however, be stated that positive evidence is lacking to associate them specially with the A.I.F.

Peptic ulcer. The discovery in the late thirties by the medical profession of the wide incidence and psychogenic relations of peptic ulcer was associated with a general impression among returned soldiers that there was a special liability through war experience. The S.M.O. of the New South Wales Branch (Colonel Kenneth Smith) encouraged an enquiry by Dr. C. K. Parkinson into the statistical aspect of the question. Three years were spent in accumulating instances of death through this cause among returned soldiers and in the civil population of New South Wales. An analysis of 1,000 deaths in returned soldiers in New South Wales led to the conclusion that no causal relation could be established;⁴⁶ the comparative incidence of death from peptic ulcer in this block of cases being 1.84 as compared with 1.86 in the civil population.

"Debility". This diagnosis enters somewhat widely within the pensioning figures for the A.I.F. and (as elsewhere noted) it is a diagnosis which would seem to have some (though not a striking or exact) basis in physiology and pathology. But as a link between the mental and the physical sphere it may be held to afford perhaps the most tenable aetiological and scientific basis for the concept of the "burnt out" soldier. (A statistical purview of the medical problems of "repatriation" will be found in Part V of *Chapter XVII*.)

To condemn even in some degree the trend of a policy which has been accepted as national requires courage, and calls for constructive suggestion. An alternative, the writer believes, is to be found in the history of the Australian Imperial Force itself. The "preference" which the nation

⁴⁶ It may strongly be urged that scientific enquiries of this kind should be provided for in the grant to the Commission by the Government and made a feature of Departmental activity and interest. The recorded experience of this present war, and the trend of current theory as to a psychogenic causation in the condition here examined—a trend which carries tremendous possibilities, both for good and for evil—should be enough to ensure this long overdue reform.

should promote by every means in its power is that which gives fullest scope to the A.I.F. characteristics of courage and self-help. The following record from the history of men of the A.I.F. who suffered great hurt and were subject to terrible disablement shows how far it is possible, given "a fair go", to rise above physical handicap, and that in the aftermath of war also "the moral is to the physical as three to one".

The sum of the whole matter: self-help

An indication of the extent to which a determined and capable man can re-educate himself in this respect is given in the following letter from a wife describing the work carried out by her farmer husband, who had lost his right arm in the war.

**1. A bushman:
the case of 5593
Pte. K.J. Iredell
27th Bn.**

On reading your letter to my husband, inquiring about the use of his artificial arm and commenting on his letter, I felt I would like to write and tell you of a few of his more outstanding abilities. As he is a very independent man and hates any praise, he will not thank me for having written this—but as you are evidently interested in his case it will give you some idea of what can be done with a good will, minus a limb.

He has a fairly efficient set of farm tools, and can use a brace and bit, saw, hammer and nails with any man, and is keen on carpentering and odd jobs about the house.

He can put his foot in the stirrup and mount a horse without any bother. He carries a small pair of sheep shears on his saddle when amongst the sheep, and he wigs and attends to the sheep when necessary and he has even shorn a double-woolled sheep when found in the scrub block; and I have seen him bring home a sheep in front of the saddle—and how he got it there still remains a mystery, as I know he had no one with him. He always brands his own sheep in the shearing shed and stencils the neatest branded bales that leave the railway station. We have a full-size scythe, which he uses when necessary to cut the grass, by putting a strap from the handle behind his elbow and around his shoulder; he also wheels a barrow in a similar way with a strap around his neck.

He catches his own sheep, straps their legs, and brings in the truck to kill for mutton, and he and our thirteen-year-old son manage that between them, as this job was previously done by a neighbour. His sheep dogs are invaluable to him—he trained them himself—as are also his teeth (it sounds rather funny, but he finds innumerable uses for them, e.g. to hold his razor strop and the reins of the bridle when riding, to get a fresh grip of the reins as he rides a spirited horse).

He is a reliable shot with the rifle and 410 shot gun, and has played and served a set of tennis, as well as playing a game of cards without assistance. He is very particular over his clothes and wears a semi-starched collar (detached) which he puts on, and ties his own tie without a crease or fault (again bringing his teeth into use).

He goes about all these things quietly, and never displays any

of his abilities. This looks rather like a letter of praise coming from his wife, but not many see and know better than I do how patient and capable he can be, and he has always said he is thankful he lost an arm and not a leg.

He has never worn his arm since his discharge as it is a big weight and has so much strapping. These are a few instances picked from his daily life. It will probably give you just an idea of what can be done by one hand and the remains of another arm, when you see his name written by it. . . .

The war history of Lieutenant Wood illustrates the results that can be achieved by similar determination and intelligence applied to the problem of a skilled sedentary occupation. The following note has been compiled from Mr. Wood and from the diary of Colonel D. A. Cameron, A.A.M.C., who operated on him.

**2. A townsman:
case of
Lieutenant C.T.
Wood, 54th
Battalion**

Lieutenant Wood was wounded on 21st October 1917 in the front line at Broodseinde.⁴⁷

At the C.C.S. "I must have been all in" (he writes) "for I have no recollection of the operating theatre at Remy, nor of being taken to it. Next day Colonel Cameron looked in on me in the ward, and told me of the nature of the operations.

"Amputation R. Forearm mid 1/3

"Amputation L. Leg lower 1/3.

"Amputation great toe and 2nd toe R. foot

"Wound dressed. All wounds left open.

"I remember him telling me that I was the unusual occasion of three surgeons being busied at once, each taking a distinct operation, and that I had the distinction of attention in that respect by an Englishman, a Canadian and an Australian. His kindness and interest was very cheering and has always been a very pleasant memory. On the same day Captain Chaplain Archer of the Canadian Forces wrote to my wife, and on the following day I bought a writing pad and wrote her myself in pencil, my first effort with my left hand."

With this effort began a long and tedious experience of recovery, replacements and retraining. This long story (every mile and movement of which may be traced in appropriate chapters of these volumes) must be skipped. Our note concerns the end of the story:

"I had arrived home on the 17th March 1918, was discharged on

⁴⁷ The circumstances, first in the Battalion R.A.P. (Capt. C. H. L. Leedman, A.A.M.C.), then of clearance by ambulance bearers to the A.D.S., Menin Road, and evacuation to C.C.S. at "Remy Siding" may accurately be reconstructed from the account given of these battles in *Vol II*, pp. 239-41. Iredell's case is referred to in *Vol II*, p. 346.

a full pension on the 18th May 1918, and immediately returned to my work, seven months after being wounded.

"The extent of my disabilities at that time was clearly regarded by the Officers of my Department as a hopeless handicap to my efficiency. I felt otherwise and determined to demonstrate that I was as efficient as any other officer without my apparent difficulties. I succeeded in this, and not the least aid in accomplishing my objective in this direction has been the artificial arm supplied me by the Repatriation Department. I became as proficient in writing by its aid as I was before the loss of my right hand, and write both left-hand and right-hand as I choose with equal ease. . . . In addition to handwriting, I derived great assistance from the artificial hand in type-writing, using the forefinger on the shift key on the right of the machine. . . . I now hold the position of Chamber Magistrate at the Central Police Court, Sydney, and Stipendiary Magistrate.

"Whilst in Brisbane in 1934, I called on Dr. Cameron and renewed our acquaintance. I found that he had a detailed record of my case which he was able to turn up, and renew memories of mutual if perhaps diverse interest."

It was a great pleasure to me to meet Dr Cameron again. I have never forgotten his few minutes' chat with me on the morning after my operation, and the pride I felt in the fact that, as he put it, I had the distinction of three Duggens operating in three distinct operations at the same time, one an Englishman, one a Canadian, and the other, himself, an Australian. It was the efficiency of his business I felt proud of, the care that was thus bestowed on the unit, and of the part Australia had played in Dr Cameron, and of his kindly words.

Yours faithfully

C. Wood

The following record is abbreviated from a "Celebrity" article in *Reveille* (1st October 1935).

There has been published this month a war book, entitled *There*

and Back. The author is Rowland Edward Lording. From the day when recruiting opened in August 1914 young Lording fretted to join the ranks of the A.I.F. He at last realised his ambition on his 16th birthday—June 20, 1915. On July 19, 1916, after a quiet tour in the line, came Fromelles—and tragedy! As Lording was leading his section across No Man's Land he was struck down by a savage burst from a machine-gun, which ripped his chest and arm, and next minute, as he lay crumpled up, several pieces of shell lodged in his back.

One of his cobbers, Stan Hill, dragged him back to our line and some hours later stretcher-bearers carried him out—and thus began his long journey home. At Boulogne, where he spent six weeks hovering between life and death, the full extent of his shocking wounds was for the first time revealed. An immediate operation, followed by a blood transfusion, was imperative. Tetanus supervened, but after a fight lasting ten days, this dreadful affliction was conquered. Transferred to hospital in England operation followed operation, and it was not until January, 1917, that he was able to get out of bed for the first time. Towards the end of the following month Lording embarked for home but the fight to live was not yet over, and throughout the years which followed it was only his indomitable spirit which carried him through.

Operations virtually became part of his existence—in 15 years he underwent 52. But, despite all this, he has carried on with characteristic grit, taking art leatherwork, poultry farming, accountancy, and other occupations in his stride. In addition, he was for 18 months honorary manager of the Employment Bureau of the Limbless Soldiers' Association; and since its inception, for several years past, has been hon. secretary of the 30th Bn. Association. But perhaps his greatest achievement in the returned soldier movement is the part he played in the formation and organisation of clubs which to-day constitute the Legion.

Such, in brief, is the story of R. E. Lording, who deserves a special place (if anyone does) among the immortals of the A.I.F., and whose book, a stark and human story, will, we feel sure, meet with unqualified success.⁴⁸

Before the war Mr. M. Napier Waller was known as an artist of high promise. Joining up on 31st August 1915, he was wounded by H.E. at Bullecourt in the back and shoulder. His right arm was amputated at the shoulder-joint. On return to Australia he set to work to train his left hand to do all that his right had done.

The Australian War Memorial at Canberra has been acclaimed one of the finest of its kind in the

⁴⁸ It may be added that Mr. Lording's book, *There and Back*, tells of another self-conquest, more difficult than any of these—over a drug habit acquired in time of pain in hospital, but eventually vanquished by the will power of a young soldier of only twenty years.

world. The final and artistically most original ornament to this magnificent creation will be Mr. Napier Waller's series of symbolic windows in glass mosaic (a form of art in which he has achieved world-wide recognition) round the central dome. The drawings for these are complete, and the work now in progress.

The series may appropriately conclude with the following supplied by the former Principal Medical Officer of the Commission, Lieut.-Colonel Courtney:⁴⁹

In a Red Cross Home a man suffering G.S.W. Head was bedridden for years. Poorly educated and of a rough type, he became so completely bored with life that his conduct became as atrocious as a bedridden man's could be. On one of my rare visits the Matron complained so bitterly of it that his removal seemed unavoidable if female nurses were to be retained. So I gave him the rough edge of my tongue for ten minutes, even mentioning Gaol hospital; then for five minutes he got the sweet edge and we agreed that boredom was more disabling to him than his G.S.W. Raffia work he scoffed at so emphatically as being "women's work" that I did not dispute it, but Matron pointed out that the selling point of his raffia baskets was the fine sense of colour shown in the work.

So it was suggested that he might arrange the flowers in the ward or part of it even competing with the sister who arranged the remainder; he promised to give it a try-out.

The sequel was astonishing. He was a great success as a decorator, but, better still, he became interested in flowers as such, and desired to grow them. The Red Cross allowed him odd corners about the Home and the ultimate result was that he got suitable land outside, was discharged from the Home, and did well as a professional grower for the market.

Comment. This man's disablement was severe, but the most disabling symptoms during the later period of Red Cross Home care were not due to the G.S.W. but to his mode of life. The G.S.W. remained a seriously disabling factor in his life but the congenial and lucrative nature of his work greatly ameliorated the handicap.

It may be suggested that here, in the microcosm of an individual soldier's life-history we have the essence of Australian discipline and "morale". Capable in a high degree of selfless self-sacrifice, the Australian soldier's normal outlook was yet essentially practical and purposive, his behaviour-pattern moulded to emulation in pursuit of clearly defined ends.

⁴⁹ Col. Courtney remarks that the obtaining of properly lucrative and congenial work was a great incentive to make a man minimise and try to overcome his disability; and is the inherent right of every soldier.

Here, in some ways most typically, we have the "Dinkum Digger". And here, so far as this history is concerned, we leave him.⁵⁰ Our epilogue must open a wider perspective.

Note. In the Australian Repatriation Department and the British Ministry of Pensions the terms *attributable* and *attributability* are commonly used to denote causal relationship between a present disability and an "occurrence happening on service".

⁵⁰ For the present day outlook on the ethics and philosophy of war pensioning, and also of its strategy and tactics as a matter of practical politics, the student may be advised to refer to two documents: for the point of view of the soldier, to the admirable *War Pensions Hand Book* issued by the Victorian Branch of the Returned Sailors and Soldiers' Imperial League of Australia, and, for the point of view of the State, to the "Survey of war pensions from 1916 to 1935", in the British Ministry of Pensions' Annual Report for 1935-36. The *Service Pensions Hand Book* issued by the Australian Repatriation Commission states clearly the purpose and the procedure in Australian "Service Pensions". The *Annual Reports* of the Commission disclose the financial involvements of Australian war pensioning, and describe the provision for treatment. The strictly personal and individual system of military medical records restricts their value for the investigation of the medical problems of pensioning, or the general scientific problems involved.

A mine of information concerning the medical problems of pensioning is contained in Part II (Ministry of Pensions Medical Review) of the *Statistical Volume of the British Official Medical History, 1931*.

Miss K. Mayo's "*Soldiers, What Next?*" 1934, is a very fully documented comparative study of war pensioning, and is courageous and provocative.

The following advice, given by Sir Thomas Lewis on the study of pensioned men from the war of 1914-18, is so entirely appropriate to the present phase of the second world war that it is resubmitted in the hope that this time it may fall on less stony ground:

"The coming days of peace will offer an unprecedented opportunity to our profession. Tens of thousands of young patients have come under observation and will remain under observation for many years or for the rest of their lives. These men will come at intervals before the pensions boards. A little foresight, a little control, and a mass of information of a valuable kind can be collected, sifted, and turned to good purpose. The State can ensure one return for what it pays: it can obtain a wealth of knowledge" (Sir Thomas Lewis, M.D., F.R.C.P., F.R.S., D.Sc., in *The Soldier's Heart and the Effort Syndrome*, p. 112.)

SYNOPSIS OF CHAPTER XVII

MEDICAL STATISTICS OF THE WAR

- I. THE CLERK IN THE WAR.
Sources of military statistics. Administrative records; "Third Echelon". Clinical records; the Medical Research Committee; Australian clinical records.
- II. INTERNATIONAL STATISTICS.
Some figures of past wars; the human cost, 1914-18, Allied, Enemy and British.
- III. GENERAL STATISTICS OF THE A.I.F.
In Australia. Enlistments; recruits; standards, Militia and A.I.F.; training camps, general and clinical statistics; embarkation figures.
Overseas. A.I.F. abroad; disposal; average strength; casualties, 1914-18; classification; battle casualties; non-battle casualties; general figures of invaliding 1914-18.
- IV. A.I.F. ON THE WESTERN FRONT.
Strength on Western Front; wastage and maintenance; arrivals and departures; average stay in hospital; causes of wastage; causes of casualty; disposal of B.E.F. casualties, army area, expeditionary base; methods of maintenance; return to duty, British and Australian figures and critical appreciation; disposal in Great Britain; invaliding, Western Front.
- V. CLINICAL ANALYSIS OF CASUALTIES: WESTERN FRONT.
Nature of data and method; casualties from wounding; casualties from disease and injury.
Detailed analysis; aetiological "types" of disease; related "classes" of disease; individual "diseases" or "groups". "Non-battle" deaths in the A.I.F.; analysis by cause and location; aetiological "types"; related "classes".
- VI. STATISTICS OF PENSIONING.
Comparative figures; total cost; in relation to wage-rates and age; assessment of disability; mortality of pensioners.
Australian figures; Figures from Repatriation Commission Reports; statistical summary; clinical analysis; "service" pensions; courses of treatment. Figures from "K" card enquiry.
Note. An apology is due for the retention, through inadvertence, of four places of decimals in Table 58. It is also realised that discrepancies will be found in the Tables, particularly those dealing with A.I.F. experience as a whole. This, in the circumstances, was inevitable. Also inevitably, some of the nosological terms employed are already outmoded.

SECTION V

CHAPTER XVII

STATISTICS OF THE WAR

(Compiled by the author together with Major A. J. Withers).

I

THE CLERK IN THE WAR

THE figures here given do not pretend to be an exact statistical study. Owing to the accidental destruction of part of the Australian records by the British Ministry of Pensions and Office of Works many results have had to be arrived at by computation from sample counts. Great labour—running into several years of patient toil—has been expended by the small unspecialised staff of this history in the endeavour to repair that loss.

The sources of the figures available for medical statistics are first indicated; not merely because of the extreme importance of such figures to the military staff and the national Government, but also because of the amazing ignorance on the subject displayed not only by Commanding Officers and other responsible officers in the field, but by those responsible for ensuring the basic knowledge for post-war purposes—in particular for a sound outlook on pensions problems—at home.

This chapter, in effect, describes and then exhibits the work of the Army Clerk, the man—almost forgotten in histories and by war correspondents, and equally by colonels and privates—who sits on a biscuit box entering names and numbers on "Army Forms" while a "Fritz" pilot may be "laying his eggs" around the camp or an H.V. gun feeling for the hutments. The army can no more operate without its clerks than a bank or an emporium; without them the general could not attack, or the soldier be fed or carried or cured. Reference has been made, throughout this history, to the administrative organisation established in Australia and overseas to meet the requirements of the A.I.F., by making and compiling *returns* and *records*. The records organisation established to meet these requirements was, in its broad features, identical with the British but in detail the A.I.F. evolved its own methods and designed its own procedure.

At Home.—In October 1914, on the formation of the A.I.F. a Base Records Office was established at Victoria Barracks, Melbourne, to collate the records of the Expeditionary Force. A staff consisting of an officer-in-charge and two clerks was appointed, and an establishment based upon the average of one clerk per 1,000 enlistments, plus a small percentage as necessity demanded, to deal with additional work, was approved. By the middle of 1917, the Base Records Office staff numbered 328 and reached over 400 before the end of the war.

In addition the records offices in the six Australian military districts were divided into two sections; one dealt with records of the home army—the Citizen Force Trainees—the other with the personal records of recruits for the A.I.F., and those of the home service staff of the A.I.F.

Overseas. The organisation created overseas to deal with the records of the A.I.F. abroad consisted at first of an administrative headquarters in Cairo,¹ and a small intermediary headquarters in London. Later, when the Gallipoli Campaign ended and the bulk of the A.I.F. moved to the Western Front, the main A.I.F. Administrative Headquarters moved to London leaving a section in Cairo to serve as administrative headquarters to the A.I.F. mounted formations in Sinai and Palestine.

In addition to the records section at these A.I.F. headquarters there was established at the Base Headquarters of the British Mediterranean Expeditionary Force, of which the A.I.F. troops in the Middle East then formed part, the normal records department of a British expedition. This part of the office of the Adjutant-General to Sir Ian Hamilton remained with the 3rd Echelon of G.H.Q., back at Alexandria. To it was attached yet a third Australian Records Section, entirely separate from the one at A.I.F. Headquarters in Cairo,² which

¹ The formation of the Australian Intermediate Base Depot in Cairo in January 1915 and its functions have been set out in *Volume I*, pp. 54-6. It was at the "A.I.B.D." that the overseas copy of the Attestation Papers were held. These records formed the basis for the personal records, and on these "A.F.s" were recorded all entries concerning the troops that were promulgated in Part II Orders.

² *Australian Records Section, Alexandria.* On the entry of the A.I.F. into action at Anzac it became necessary to organise an Australian Records Section at the Adjutant-General's office at M.E.F. Base at Alexandria. This Section was formed at the end of April 1915 by assembling the "orderly room sergeants" of the A.I.F. units of the M.E.F. At the end of 1915 it had a strength of over 100 Orderly Room clerks, under Lt.-Col. C. Griffiths, who commanded it throughout the war.

After the A.I.F. had landed at Anzac and the returns commenced to arrive giving details of the casualties, the purpose of the Records Sections had to be quickly

still held the oversea copies of the soldiers' attestation papers. When the main body of the A.I.F. was transferred to France most of these two overseas Records Sections were transferred with it, to A.I.F. Administrative Headquarters in London and to the 3rd Echelon of Sir Douglas Haig's Headquarters at Rouen in France respectively. But an Australian Section was left at Alexandria for the Light Horse units, and became part of 3rd Echelon E.E.F. in Cairo. A Records Section, though shorn of important records, remained also at the smaller A.I.F. Headquarters that was left behind in Cairo.³

In September 1916 the Commandant at A.I.F. Administrative H.Q. tried to induce the War Office to allow the amalgamation of the Australian Records Section at 3rd Echelon with the Records Section at Horseferry Road, London, urging that the work was duplicated, that the A.I.F. required men for front line work, that in London the Records work could largely be done by women, and that it was also advisable to unify the system within the A.I.F. This was done in June 1917 in Egypt, but in the Western Theatre it was not effected until the day after the Armistice. The staff of the A.I.F. Records Section in London in December 1918 numbered 975.⁴

This staff had to deal with returns from Italy, Archangel and America as well as from the Western theatre of war; to Cairo came returns from Salonica, Sinai, Palestine, and Syria; and to Base Records in Australia those from New Guinea, India, Ceylon, Durban and other African ports outside Egypt. The weakest link in the provision of records was that relating to the time spent by A.I.F. troops on sea transports.

The Army forms used by the clerks of the A.I.F. abroad were almost entirely drawn from British supplies, but for local use certain British forms were modified to suit Australian requirements; these were given an

learned by the inexperienced staff. The small Australian Records Section established at Alexandria had a rude awakening to its responsibilities when the flow of returns (*A.F.'s A 36*) from the medical units at Anzac, the hospital ships, and the hospitals at Lemnos, Malta and throughout Egypt began to pour in, and in addition the Field Returns (*A.F. B.213*) from the units engaged revealed the extent of the problem.

³ The attestation papers of the Light Horse were, unwisely as it proved, sent to London, but were sent back to Egypt in September, 1918.

⁴ Of the staff of A.I.F. Administrative Headquarters, Horseferry Road, 5,758 strong in December 1918, 2,509 were A.I.F. men and 3,249 civilians; the Finance Section was the largest—1,735, the Postal Section had 669. The Medical Section of Headquarters comprised 20 officers, 1 warrant officer, 12 staff sergeants and sergeants, 2 nurses, 47 other A.I.F., and 12 civilians.

Australian classification number. The British forms were classified into seventeen groups of which the medical service was concerned in particular with four⁵ namely:

Class A.—General.

„ B.—Regiments and Corps.

„ I.—Medical.

„ W.—Forms issued in connection with the Great War.

Only a few of the forms in the various classes call for special reference. They are:

Army Form	Remarks
A. 27 Sick, Morning State; and Report of Death	Issued to Hospitals only
A. 30 Infectious Diseases; Weekly Report of	" " " "
A. 31 Hospital Admissions and Deaths; Monthly Return	" " " "
A. 31A Sick under Treatment in Barrack; Monthly Return	" " " "
A. 34 Daily State of Sick and Wounded (Home Service)	Issued to Medical Units
A. 34A Daily State of Sick and Wounded (Field Service)	" " " "
A. 35 Infectious Diseases Notification Form	W.3110 was used generally in France.
A. 36 Hospitals, Nominal Roll of Admissions and Discharges	This return is a copy of <i>Army Book 27A</i> —"A. and D. Book"—a record of Admissions and Discharges.
A. 45 Proceedings of a Medical Board (Officers and Nurses)	
B. 103 Casualty Form—Active Service	Soldiers' personal record
B. 178 Medical History Sheet	Administrative record.
B. 179 Medical Report	"Board Paper".
B. 181 Medical Clinical Chart	
B. 213 Field Return—weekly	The basis of administrative action.
B. 231 Field ("ration") State—daily	
B.2069 Crime and Offence Report	
I.1220 Medical Statistical Index Card	M.R.C. clinical record.

⁵ A full classified list and alphabetical *Index of Army Forms and Books* was published periodically and notified in Army Orders.

Army Form		Remarks
I.1237	Medical Case Sheet	A clinical record.
O.1810	Part II Orders	
W.3034	Admissions and Discharges (Hospitals)	
W.3110	Infectious Disease Notification Form	The patient's "ticket".
W.3118	Field Medical Card	
W.3185	Daily State of Sick and Wounded	
W.3210	Labels for Patients "Buff Slips" (Field Ambulances and C.C.Ss.)	

Note Part II Orders. The part of regimental (*e.g.* Battalion) orders which deals with promotions, casualties, and secondings.

Basic Records. The most important administrative record was the Attestation Paper—the soldier's contract form, signed by every recruit who joined the A.I.F. It did not have any Army Number. It contained the man's personal particulars, his past medical history, a certificate as to his fitness, and his Oath of Service. It was compiled in duplicate for each recruit on enlistment; as already mentioned, one copy was retained at the Base Records Office in Australia, and the other sent overseas when the man embarked. In addition to the Attestation Paper, a Medical History Sheet (*A.A.F. D.1.*—British number *A.F. B.178*)⁶ was also made out for each man that enlisted and accompanied him when he went overseas; its purpose was to contain particulars of the man's medical history during his service. These two forms and the entry in the nominal roll at embarkation formed the initial records concerning each man that left

Australia.

A CLERK'S JOB IN THE FIELD

The primary source of information in regard to casualties was the weekly Field Return (*Army Form B.213*) compiled by the clerks of all units for the Adjutant-General's office at the Base. They gave details of each unit's wastage and replacements, and personal particulars of all men struck off or taken on strength and the reason for this action. They also showed the

**Army Forms
B. 213 and
B. 231**

⁶ The British number was used by the A.I.F. overseas.

unit's strength and any deficiency or surplus to establishment. It was chiefly by these, and the "field state" that casualties and all changes in the strength of units were made known to those concerned; though "casualty wires", and numerous other returns, and reports were also rendered.

Records of field ambulances were normally compiled and kept at the main dressing station. The permanent record of the work of the unit was contained in an Admission and Discharge Book (*Army Book 27A*), from which was compiled the Nominal Roll of Admissions and Discharges (*Army Form A.36*), rendered daily to the Adjutant-General's office at the Base.

**A. and D.
books**

Clerks had to make out Field Medical Cards (*A.F. W.3118*) whenever a casualty was first admitted to a field medical unit.

**Field Medical
Cards**

These were clinical cards, containing the personal particulars of the casualty, diagnosis, and date of admission. They were pinned on to the patients during their evacuation from the front. Whenever each of these patients entered a field ambulance, C.C.S. or hospital, an entry was made on the card stating the unit to which admitted, latest diagnosis, and treatment given, or other observations.

When the patient was shipped to England or discharged from medical care in France, the Field Medical Cards were sent—as will later be seen—to the Medical Research Committee. Hospital Index Cards (*A.F. W.3243* and *W.3243A*) and Hospital Case Cards (*A.F. I.1220*) which were somewhat similar in design and purpose to the Field Medical Cards, were used in continuation of them when the patients were admitted to hospitals in England.⁷

During the intense fighting in 1917 labels for patients (*A.F. W.3210*), commonly referred to as "Buff Slips", became "Buff Slips" an important part of the records procedure.

On leaving the reception room (says the *New Zealand Medical History*) the patients filed through a recording office where the *A.F. W.3210* "buff slips" and the *A.F. W.3118* field medical card, not yet completed,

⁷ "The Hospital Case Card (*Army Form I.1220*) is perhaps the most important of all our medical records. It is the basis on which all medical statistics relating to the health of the Army are founded; it is very useful for research purposes, and as a medical record of an individual it is of great value to the Director-General in assisting him to form an opinion when considering claims for disability pensions." (*Journal of the R.A.M.C.—Medical Statistics by A.M.D.2—June 1925.*)

but enclosed in the waterproof envelope were tied to the soldier's tunic. . . . With his "buff slip" and his field medical card, the wounded man was conducted to the waiting and refreshment room. . . . Passing now into the hands of the medical officers his wounds were redressed, if necessary, and such surgical treatment as was demanded by splinting, removal of small superficial foreign bodies and so forth, was given, which being done the medical officer entered a description of the injury on the *buff slip* and the field medical card which was returned to its envelope and remained attached to the man, but the *buff slip* purely an inter-departmental chit, passed back to the record office now bearing the official diagnosis and by its means the *A.36* was compiled. Great accuracy was required in the entries in the A. and D. books, and in the *A.36*, as may be readily understood, as they furnished a permanent record of the man's injury and disposal.⁸

An important return that had to be rendered by medical units within Army Area was the Daily State of Sick and Wounded (*A.F. W.3185*). These returns, which "Returns": gave details by units of numbers remaining, "Daily State" died, evacuated, and returned to duty, and remaining for 24 hours in field medical units, were sent to the A.D.M.S.'s office at Divisional H.Q., or to the D.D.M.S. at Corps. There they were consolidated and provided the sick and wounded wastage rate which enabled the A.D.M.S. or the D.D.M.S. to assess the health state of the troops.

From time to time an endeavour was made to check the demand for unnecessary returns. Nothing was more irritating than the compilation of details that had no clear use or significance. In the field the almost constant stream of casualties caused the making of returns to be a heavy burden on the clerks

⁸ From *The New Zealand Medical Service in the Great War 1914-1918* by Lieut.-Col. A. D. Carbery, p. 214-15. The same authority states (p. 313) that the "buff slip" was "collected at the time of evacuation by an orderly specially posted by the loading stage. In the case of the walking wounded the *buff slip* was their ticket of admission to the lorry, without which they could not pass". Col. Carbery gives the most lucid and practical account of the keeping of records in the field known to the writer.

A paper of the I Anzac Central Bureau, signed by Maj. D. S. Mackenzie, states: "The *A.F.'s W.3210* are collected every two hours in slack times, and every hour in busy times (during an offensive), by a runner who brings them to Bureau and hands over to a sorter who is well acquainted with the formations of the 1st and 2nd A.N.Z.A. Corps and who sorts them into divisions and formations and files them in a series of pigeonholes as under

1st Aust.	2nd Aust.	3rd Aust.	4th Aust.	5th Aust.	P. of W.
N.Z.	Other A.I.F. Troops	Other Colonial Troops	X Corps	Other British Formations	

at the same time recording on a two-hourly chart the casualties by divisions and formations so that the totals can be readily ascertained at and up to the previous two hours." For an account of this "Bureau" see *Vol. II*, pp. 203 and 248n.

who were seldom, if ever, abreast of their work at times of heavy fighting. The reader may appreciate the task of the clerical section of a field ambulance as outlined by a clerk (Corporal O. P. Kenny) of the 3rd Field Ambulance in December 1917:

To the Headquarters Section of a Field Ambulance (he wrote) necessarily falls the bulk of the routine work: rendition of "routine returns", correspondence, and orderly room work.

**Clerks at
field
ambulance**

Returns for an average month approximate 400 which must be rendered day after day, notwithstanding how inconveniently the unit may be situated; if rendered late the displeasure of H.Q. is invariably incurred.

In addition to "Routine" returns "A" Section clerks are called upon to perform a multitude of duties and expected to be authorities upon Military Law, Billeting, Rules regarding the collection, treatment, and evacuation of patients, etc.—in fact, an encyclopaedia for the unit.

In the 3rd F. Amb. "B" Section Clerks specialised in A. and D. book work, and "C" Section undertook financial matters of the unit and Regimental Fund, Canteen Fund supervision, pay duties and also conducted the leave roster.

At an Advanced Dressing Station. During an offensive the clerical section has an extremely strenuous task including A. and D. records of each patient treated and returned to duty, and particulars of each patient dying at the A.D.S. In addition it is necessary to keep an accurate tally of all patients passing through the A.D.S.

At a Main Dressing Station the A. and D. Clerks are kept working at high pressure all the time. A.F.'s "A.36" have to be rendered daily, and divisions supplied with bi-daily casualty wires, "A.F.'s W.3185"; also units, Brigade, Division, and Base supplied with particulars of all deaths.

At Divisional Rest Station. The D.R.S. usually has accommodation for some 350 men which keeps the A. and D. clerks just comfortably occupied.

With Unit on the move. Prolonged marches are unpleasant experiences for the general routine clerks. During the end of a fatiguing day's march, sore footed, with no office conveniences—a stray packing case acting as a desk and office furniture generally—they have to set to and compile returns for the following day.

It is usual during these marches for the Ambulance to be attached to an Infantry Brigade, whose sick it has to collect and transfer to Rest Stations or evacuate to C.C.S.—as may be found necessary.

In General. The typewriter has to be obtained through Regimental Funds. It is advisable to place on record plans of the various Dressing and Rest Stations as an appendix to the Unit War Diary.

The clerical work at the office of the A.D.M.S. was dependent on the nature of the operations; at times certain

of the responsibilities were undertaken at the D.D.M.S. office at Corps Headquarters, but the general nature of the administrative duties were similar. The **Clerks of A.D.M.S. (Divn.) and D.D.M.S. (Corps)** A.D.M.S. 4th Australian Division, Colonel Barber, noted the great difference in the forms and returns required in different corps and armies and the great inconvenience caused thereby.

From October 1917 to January 1918 the 4th Australian Division was attached to three different Corps, three Armies, Lines of Communication, and G.H.Q. Reserve. Fresh lists of returns and pro-forma had to be prepared after each change, except when we were on L. of C. and G.H.Q. Reserve, at which time the usual sick returns were forwarded and returned "not required".

Returns for purely medical purposes were comparatively few and all were for administrative use. The most important were those concerned with infectious diseases, and those recording the evacuation of sick and wounded. These returns enabled a check to be kept on any abnormal rate of sickness, or immediate action to be taken to eradicate any source of infection. A brief summary of the work at the D.D.M.S.'s office has been written by a Corporal clerk, S. T. Batty.

The staff consisted of one Staff-Sergeant, and two Privates, one a Register Clerk and the other a Returns Clerk. The quarters comprised two Nissen bow huts, one of which was sub-divided by a hessian partition. Half was occupied by the D.D.M.S. and D.A.D.M.S. and the other half by the Chief Clerk and Register Clerk. The other hut was used as sleeping quarters, and as an office for the returns clerk.

Usually work commenced at 9 a.m. All correspondence coming in was opened by the Chief Clerk, and placed in a tray labelled "register in". Having registered, stamped and numbered the correspondence the Register Clerk passed it to the Chief Clerk who prepared answers to routine matters and passed the correspondence to the D.A.D.M.S. for signature or attention. The D.A.D.M.S. signed all correspondence dealing with routine, leave, Sanitary Sections and any standard rulings. Correspondence from higher administrative authorities and matters requiring more detailed consideration and discussion were passed to the D.D.M.S. Wires, both outward and inward, were dealt with in the same manner as ordinary correspondence, except that they received immediate attention.

Clerks kept up to date a map of the Corps area, showing Corps boundaries, and divisional boundaries. The front line was altered from day to day in accordance with situation maps issued by Topographical Section. The various Medical Stations and posts were indicated by pins.

The *W.3185's* were received from Field Ambulances, consolidated and transmitted to the D.M.S. Army. In addition there were casualty wires, weekly and monthly returns, etc., all dealt with by the Returns Clerk. The consolidation of *W.3185's* was undertaken at the A.D.M.S.'s office except for a period in 1917-18 when it was undertaken by D.D.M.S.

Clerks at casualty clearing stations had a job somewhat similar to those of field ambulance clerks. A. and D. Books were maintained, *Army Forms A.36* rendered to 3rd Echelon, and *A.F.'s W.3185* compiled and submitted to D.M.S. Army to calculate army wastage. The D.M.S. Second Army, explained the method of calculating army wastage as follows:

Since January 1916, *Army Wastage*, as furnished by D.M.S. to 12 noon on Saturday, is calculated on the *number of cases evacuated from C.C.S. to Base*: not as hitherto on number admitted to C.C.S. from Field Ambulances, etc. This represents more accurately the real *waste* since the patients returned to their units from C.C.S. are returned within a few days. It causes a complication however in that wastage from *Divisions, i.e., Corps Wastage* (or Divisional Wastage) is based on *number of cases admitted to C.C.S.*

On the lines of communication ambulance trains, and motor ambulance convoys played their part, but from the point of view of records they were unimportant.

At the hospitals on the lines of communication and at the bases the clerks kept A. and D. Books, but in place of the *A.36* the hospital clerks rendered to those at 3rd Echelon a Daily Casualty Return (*A.F. W.3034*) which, like the *A.F. A.36* was a copy of the A. and D. Book entries.

Australian Records Section, 3rd Echelon. The flow of returns to the 3rd Echelon was dealt with by the unit clerks. Each Australian unit was represented at the 3rd Echelon by its orderly room sergeant, whose basic records consisted of a Nominal Roll of his unit and a "Casualty Form" (*A.F. B.103*) for each member of the unit. The duty of the unit clerk was to post all entries concerning members of his unit on the respective *Army Forms B.103* from the numerous returns that were received and to promulgate in Part II Orders all changes to the personnel of his unit caused by casualties, promotions, postings, punishments and other happenings including the bare diagnosis of any illness, all notified to the unit clerk by the Field Returns, the *A.F. A.36*, Crime and Offence reports (*A.F. B.2069*), and so forth. He drew up the reports of deaths (*A.F. B.2090A*) and initiated the action as to notifications of casualties. Thus the

Australian clerks at 3rd Echelon, Rouen, telegraphed to Administrative Headquarters A.I.F. at Horseferry Road, the reports of deaths, dangerously or seriously ill (sick or wounded) for transmission to Australia.⁹ Other information was promulgated in the weekly Part II Orders (*A.F. O.1810*) and copies distributed to units in the field, to the Paymaster, Records, and other departments of Administrative Headquarters, and to Australia.

Administrative Headquarters. The distance of the A.I.F. from Australia and the autonomous nature of the force necessitated the maintenance of an intermediate base headquarters as the channel of communication with the British War Office and the Defence Department in Australia. The records office here maintained what was, in effect, a duplicate of the records of 3rd Echelon. Changes appearing in Part II Orders were entered on each man's attestation paper at Administrative Headquarters. Eventually the section at 3rd Echelon was amalgamated with this section as already described.

In this mass of clerical work a partial failure occurred in the difficult task of keeping a full and accurate record on the vitally important *Medical History Sheets* (*A.F. B.178*). The problem of compiling them did not receive the attention it deserved. A Sheet was made out for every member of the A.I.F. but the subsequent completion of entries was dependent on the staffs of many hospitals in several theatres of war.

In Egypt during most of 1915 little or no attempt was made to complete these records. In September 1915 the War Office ordered that a Medical History Sheet should be completed for all men who had been under treatment in hospital. Its purpose was for

dealing with claims for pensions, etc., which may hereafter arise. . . . The Medical History Sheet will invariably accompany the man on being transferred to another hospital.

An order of 23rd January, 1918 said:

As a part of the official record, the Medical History Sheet of an Australian soldier is an essential document, and great care is therefore necessary that all available medical information concerning each soldier is inserted on it.

⁹ Originally this information had been cabled direct to Australia from 3rd Echelon, Alexandria, but when Administrative Headquarters moved to London it undertook this duty.

But the clerks in hospitals found it difficult to get the Medical History Sheets of patients in time to make the necessary entries.¹⁰ This was overcome by compiling temporary sheets in the hospital to which a patient was first admitted. The temporary sheet accompanied the man until he was finally disposed of when it passed to the officer-in-charge of Records.

For the A.I.F. as a whole, the Medical History Sheets were very defective and could only be used for supplementing administrative records (*Army Forms B.103*) which were used for pensions purposes.¹¹

Medical Report. Concerning men who had ceased to be fit for fighting probably the most important document was the Medical Report (*A.F. B.179* or Australian *A.F. D.2*) which has already been described here as the "Board Paper", the report of the Medical Board. On an invalid's return to Australia his personal documents accompanied him—including the Casualty Form (*A.F. B.103*), Medical History Sheet (*A.F. B.178*), and Medical Report (*A.F. B.179*).¹²

Certain details of his medical and other history had been transmitted to the Base Records Office, Melbourne, from Administrative Headquarters overseas by cable and mailing of Part II Orders, and was recorded on his personal record there.

Concurrently with the compilation of the administrative

¹⁰ *A.F.'s B.178* of members of the A.I.F. serving overseas from the United Kingdom were filed at the Records Office at Administrative Headquarters. Upon notification of a first admission to hospital from overseas of a member of the A.I.F., his original *A.F. B.178* was forwarded to the hospital concerned by the Officer i/c Records, Administrative Headquarters. If such Medical History Sheet was not received by the hospital within six days after the admission, application was made for it to Horseferry Road. The Medical History Sheet was then transferred with the man (with his transfer certificate, *A.F. B.172*) from hospital to hospital and finally, on his discharge from hospital, it returned to A.I.F. Records, Horseferry Road.

No action was taken by the hospitals at the Expeditionary Bases in France to compile Medical History Sheets. This period of the patient's history with the B.E.F. is contained in the Field Medical Card and Case Sheets for selected types of disease or injury, otherwise the hospital admission and discharge entries are the only records. In Egypt from 1916 onwards circumstances favoured the compilation of Medical History Sheets and in consequence the administrative records of the personnel treated are comparatively complete.

¹¹ Upon men being sent either to or from a theatre of operations the relative *A.F.'s B.103* were transferred from A.I.F. Administrative Headquarters to or from the Australian Records Section of 3rd Echelon. After the amalgamation a small Australian section remained at 3rd Echelon to send to A.I.F. Headquarters in London details of hospital admissions and discharges, and deal with the personal effects of Australian casualties that were received at the Base.

¹² The overseas copy of his Attestation Paper was retained overseas for reference as the "home" copy was available at the Base Records Office at Defence Department Headquarters.

records of the A.I.F. there were assembled, without any Australian medical control or direction, certain clinical and statistical records of the force—those on which the medical profession must partly rely for its future knowledge, and the Government for its policy. To guide clerks and their controllers in maintaining a uniform system and to reduce the margin of error in the statistical tables ultimately to be compiled on 15th March 1917 instructions were issued by the Army Council. They dealt with the compilation of many of the important records described in this chapter.¹³

In November 1914 an offer by the *Medical Research Committee* to place its resources at the disposal of the War Office for medical statistical purposes was accepted by the Army Council, and the Statistical Department of the M.R.C. under the eminent statistician, Dr. John Brownlee assisted by Dr. Matthew Young, undertook the whole compilation of statistics of the sick and wounded from the Home and the Expeditionary Forces. Accommodation was secured at Russell Square, London. Card indexes were compiled from the official returns and typists were engaged at military hospitals throughout the country to secure the rapid collection of information from the hospital books. Returns from the forces overseas were transmitted to the Statistical Department some time after the necessary extracts had been made. The medical and surgical Case Sheets were also sent thither at intervals by the hospitals, to be sorted, classified, and summarised. It was found that the work on the Medical Case Sheets was of great help in supplying information sought by M.O's in France as to the later history of the patients.¹⁴

¹³ Admission and Discharge Books, Medical Case Cards (*A.F. W.3243*), Field Medical Cards (*A.F. W.3118*), Weekly Return of Patients in Hospital (*A.F. W.3067*), Medical Case Sheets (*A.F. I.1237*), Monthly Return of Sick and Wounded from Expeditionary Forces (*A.F. W.3227*) and Monthly Return of Sick U.K. troops (*A.F. W.31*). The instructions also stated that many soldiers being admitted to hospitals could be treated as out-patients, being relieved by their commanders of duties or put to such duties as they could perform.

¹⁴ It was at first found almost impossible to trace particular patients. Yet at any point of the chain of medical units through which patients passed it might be vital for an M.O. to gain rapid information as to the later history of a patient or groups of patients as a guide to future treatment or present action. Accordingly (1) Printed cards and envelopes were provided for officers desiring information about a patient sent to the Base. The desired information was placed on the card by the officer at the Base, who then posted it back to the sender. (2) Another set of cards and envelopes was supplied for use by officers specially nominated at General Headquarters for enquiry into the results of treatment of selected groups of cases—abdominal wounds, amputations, chest wounds, fractures, head wounds, D.A.H., wounds of joints, trench nephritis, neurological cases and spinal injuries. This information was also statistically valuable.

In June 1917, it was decided that the Field Medical Card, used in France in place of the Medical Case Sheet (I.1237), should serve as a continuous diary of each casualty's clinical history while overseas, and should be transmitted with the patient to the United Kingdom for the information of any M.O. into whose hands he might pass on arrival in hospital.

These and other records, compiled by the medical units through which a patient passed, eventually reached the Statistical Department where they were assembled in each man's *dossier*, the details then being transferred to an index card. The intention was to transfer the information from them to *code cards* on the Hollroth system for mechanical sorting—this being done by an elaborate system of punching holes in the cards, 8,000 different entries being possible.

In 1915 the statistical work became so heavy that the department was transferred to the British Museum which offered almost complete protection against danger from fire. The chief basis of statistics was the A. and D. Books and (for the B.E.F.) the Medical Research Committee *Medical History Card*; but these were supplemented by the *Medical Case Sheets* and other records. The M.R.C.'s Report stated that if the task had not begun early in the war a large part of the information necessary for statistical purposes would have been lost.¹⁵

In view of the size of the task a modified scheme was drawn up providing for the minimum of statistics which, in the opinion of the Army Council would provide data for a scientific analysis of casualties. It provided for

- (1) A general table showing the numbers of admissions to hospital, deaths, invalids from the service, and average constantly sick for the diseases, wounds and injuries, or groups of diseases, wounds and injuries, specified, with the ratios per 1,000 of the strength under each heading.
- (2) A table showing the numbers of admissions to hospital, deaths, invalids and average constantly sick on account of wounds, classified according to site of wound, with ratios per 1,000 of the strength under each heading.
- (3) A table showing the number of admissions for wounds classified according to the nature of the wounds and their site.

¹⁵ After several months it was found necessary for the accuracy of the Card Index, to classify and index all Medical Case Sheets for the correction of faulty entries in the A. and D. Books.

- (4) The foregoing information to be extracted separately for each force and for the United Kingdom.
- (5) The average number of days in hospital for the various diseases to be calculated by sampling a series of cards in which this information is shown completely.
- (6) Records of certain diseases to be codified by months.¹⁶

The *British Official Medical History* states:

Thanks to the work of the Medical Research Council in codifying the medical records, the figures for 1915 in respect of British troops only are the most complete record of hospital admissions in any force during the Great War.

X-Ray Plates. X-Ray plates of A.I.F. patients were passed to the Medical Research Committee; 12,000 plates made by the three Australian Auxiliary Hospitals were examined and about 500 were selected to illustrate the conditions dealt with there. These were returned to Australia. The collection of *museum specimens* has been already described.¹⁷

Canadian Statistics. The statistical records of the C.A.M.C. were compiled by itself on behalf of the Canadian Government, and it was arranged that the Canadian card index would be copied from the cards of the general index which included Canadian casualties.

In Australia the Adjutant-General in July 1917 had expressed concern to the D.G.M.S. (General Fetherston) as to whether sufficient, if any, data were being recorded by the Defence Department for medical and other statistics useful historically and scientifically. General Fetherston replied that he did not suggest the task being undertaken unless it could be done thoroughly, which would cost time and skilled labour. The A.G. asked that the matter be referred to the Minister (Senator Pearce) who after consultation with the D.G.M.S. decided that an enquiry should be made as to what the War Office was doing.

In June 1918 the War Office replied that the Medical Research Committee was collecting the information on statistical cards.

Arrangements can be made for the Commonwealth Government to

¹⁶ According to the Statistical Volume (p. 274) of the *British Official Medical History*.

¹⁷ Chap. v.



33. THE CASUALTY RECORDS OF THE AIF

The "Non-effective Records Section" at AIF Headquarters, London, in 1918



34. THE REPOSITORY OF THE AUSTRALIAN NATIONAL ARCHIVES OF THE WAR

The Australian War Memorial, Canberra, wherein the medical and other records are housed. The Library occupies a greater part of the ground floor of which the northern windows can be seen in this illustration.

Aust War Memorial Collection No. X163

To face p 861

have a copy of the card referred to for every member of the A.I.F. who has been in hospital, as soon as they have been completed.

This offer was accepted and it was proposed to start work on similar lines in Australia. The A.I.F. Collator of Medical Records, Colonel A. G. Butler, who was on his way to Australia, would first confer with the Commonwealth Statistician, Sir George Knibbs. By the time of that conference, however, the war was over and the opportunity for collection of statistics in Australia was finally lost.¹⁸

The arrangement for the oversea records however stood, although in September 1919 Colonel Butler, when in London,

**The A.I.F.
statistics**

had represented that the Australian records, which lacked special Australian control, were in a vulnerable position. He wrote to General

Howse:

I think strongly that future arrangements for Medical Statistics should come under the (Australian) Record Section and be subject to similar exact control.

The Canadians will score in having their own records.¹⁹

In Australia the Commonwealth Statistician, Sir George Knibbs, wrote to Colonel Butler:

If the medical records of the last War are well drafted information of great sociological importance will be deducible. In the next war, which I imagine will occur at no greatly distant date, we shall be able to forecast better what preparations must be made for the fighting forces.

Butler was instructed to collect material for a combined

¹⁸ The Adjutant-General had suggested statistics under the following headings:

A.I.F. Enlistments.

- Percentage of rejects;
- Causes of medical unfitness;
- Comparative statements of country and city rejects;
- Trades and occupations showing a high percentage of rejections.

Medical Local Camp Histories.

- Sanitation,
- Ambulance work;
- Hospital nursing,
- Convalescence;
- Average time in hospital;
- Cost of medical and dental treatment.

Returned Sick and Wounded.

General—Statistics.

¹⁹ Col. Butler wrote to Maj. J. L. Treloar, Aust. War Records Section on 1 July, 1919: "In accordance with your request I interviewed Major Galwey, W.O. (A.M. D.2) with a view to obtaining written notification from the W.O. that a duplicate card (M.R.C.) would be prepared for Australian purposes. Major Galwey informed me that Headquarters A.I.F. had already twice been informed in writing that this would be done."

technical and statistical, and also narrative history. In 1922 it was decided by the Health, Statistical and Defence authorities. in conference that the cost of making the necessary extracts was too great, the task, if it was to be done, being thus thrown on the historian.

The cards to be dealt with were then still with the War Office, but early in 1922 the Australian Government was informed that the 1914-15 index cards and code cards were ready for despatch and the index cards for 1916 onwards partly sorted. The 1914-15 cards duly reached Australia but in July 1922 the War Office intimated that it regretted that it could not continue the work of coding. There were 735,000 cards of which 475,000 were arranged in regimental order.

The War Office asked what the Australian Government wished to be done with the cards. In March of the following year the British Ministry of Pensions informed the War Office that the cost of tabulating the cards on simplified lines would take six months and cost £850. Major Tait, representing Australia, advised that this offer be pursued; but meanwhile, on April 26th the Ministry of Pensions informed the War Office:

Recently the Canadian Government notified this Ministry through you that they did not consider it advisable to preserve the Medical Record Cards of Canadian soldiers and permission was obtained by this Ministry to have them destroyed. . . . His Majesty's Office of Works removed and destroyed the medical record cards, not only of Canadian soldiers, but of soldiers of other Colonies, including those of the Australian Forces.

The Commonwealth Statistician had undertaken to tabulate the cards and had enquired when they would be received. The War Office had now to be advised that the Australian Government had made no other provision for preserving and consolidating its medical records and for obtaining such medical statistics as these records permitted. The War Office replied that the A. and D. Books were available from which statistical information could be compiled. They were accordingly brought out to the Australian War Memorial in Melbourne.²⁰ By colossal labour extending over a number of years the small staff of the Australian Medical History extracted and classified the

²⁰ In July 1924 the A.W.M. were asked that the A. and D. Books be passed to Base Records for verification of doubtful entries on A.F.'s B.103. This was arranged and the 2,350 A. and D. Books were passed to Base Records.

statistics of disease. The results appear in the statistical tables later in the chapter.

Fortunately the Australian Medical Case Sheets, being no longer required by the British statistical authorities, had been removed to Australia on the representations of Colonel Butler in 1919.

The personal records of the A.I.F. gave a comprehensive history of each member of the force. They showed the movements from the day of enlistment until discharge or death, and contained details of casualties, promotions and reduction, honours and rewards, crimes and punishments, etc., and in fact were a collection of personal histories, which during the war period were available for war purposes and later for post-war use in connection with repatriation, reinstatement in civil life, and pensions claims—in justice to the claimant and the taxpayer. An immense number of inquiries were answered by means of them during the war, and statistics produced from time to time to guide commanders and administrators with knowledge of their Army's present or prospective strength or weakness. Indeed not one great battle could have been fought without them.

II

SOME INTERNATIONAL STATISTICS OF ENROLMENT AND CASUALTIES

One of the most striking features, from the medical standpoint, of the history of past wars is the gradual emergence of a system of medical statistics—the sign of a profound change in the social involvements of warfare. The ordinary “statistical table of casualties” of a modern army (such as the regular form shown in the margin) is a reflection of the machinery of modern warfare, as well as of the events of the war. If anyone compares such a table with that which can be constructed for even the best documented wars of the past he can visualise the contrast between the applied science and “humanitarian” principles of

Field Armies Average Strength	Killed in Action	Died of Wounds	Died of Gas	BATTLE CASUALTIES			Prisoners of War	Total Battle Casualties	NON-BATTLE CASUALTIES		TOTAL CASUALTIES
				Wounded	Gassed	Missing			Died of Injury and Disease	Sick and Injured to Hospital Cas.	

to-day and the technical crudities and social inhumanity of even the "classical" era of Greece and Rome.

Thus, while the military events of the Graeco-Persian wars, of the Peloponnesian war, of Caesar's Gallic and Civil wars are almost as clear and vivid to us as those of the wars of to-day, the statistical data available, consisting as they do of little more than general estimates of the forces engaged and numbers killed, are vague to a degree that makes exact statistical comparison almost impossible. In the mere headings given in the margin two features of themselves stand out as embodying the difference between past and present: the recording of "non-battle" casualties; and the exact assessment of wounded and prisoners of war. Figures for "wounded" are generally lacking from records of ancient wars and battles: indeed, in the pre-classical eras, the number of "prisoners of war" is recorded only if they were enslaved, and not summarily put to death.

To generalise, the statistical history of human warfare illustrates, at least as strikingly as it does the "scientific" development of the human race, the fact of a *continued "moral" progress*. For if—as this history of the Australian Army Medical Corps has shown—modern warfare cannot be waged without the help of scientific medicine, the broadcast and the daily Press bring evidence, even *ad nauseam*, of the fact that even the warfare of Nazism has as yet failed to destroy among its own people at least an outward show—even if only for the purpose of propaganda—of respect for the "dictates of humanity".

Of all the orgies of self-destruction in which the human race has indulged since its rise to the "lordship of creation" it is not open to question but that the First World War, of 1914-18, stands out as by far the "greatest" in the size of the "kill". This does not of necessity imply that comparatively as well as actually the loss of life or limb and the destruction of "wealth" (in the sense of the accumulated creations of human thought and labours) was greater than in any war of the past. The following figures for a few modern wars will give a background.

**The
total
human cost**

TABLE NO. 1

BATTLE AND NON-BATTLE CASUALTIES AMONG BRITISH TROOPS IN PREVIOUS WARS

Campaign	Duration	Average Strength	Battle Casualties		Non-Battle Casualties	
			Admissions to Hospital	Killed in Action and Died of Wounds	Admissions to Hospital	Deaths in Hospital
Crimean War	1854-6	111,000	—	4,058	—	21,000
Zulu War ..	1879	12,651	162	800	9,348	314
Afghanistan ..	1878-80	10,246	Incl. in Non-Battle	161	28,761	1,122
Egypt	1882	13,013	378	93	7,212	79
Nile Exped. Force	1884-5	10,771	241	126	8,712	431
Chitral Relief Force	1895	5,213	35	13	3,935	128
N.W. Frontier, India	1897-8	5,741	416	149	11,065	291
South Africa ..	1899-1902	208,226	21,292	7,091	404,126	14,048

Authority—*Army Manual of Hygiene and Sanitation, 1934, p. 214.*

TABLE NO. 2

APPROXIMATE AVERAGE ANNUAL RATIO (OF CASUALTIES SHOWN IN TABLE 1) PER 1,000 OF STRENGTH

Campaign	Duration	Average Strength	Battle Casualties		Non-Battle Casualties	
			Admissions to Hospital	Killed in Action and Died of Wounds	Admissions to Hospital	Deaths in Hospital
Crimean War	1854-6	111,000	—	17	—	89
Zulu War ..	1879	12,651	17	85	988	33
Afghanistan ..	1878-80	10,246	—	8	1,443	56
Egypt	1882	13,013	125	31	2,380	26
Nile Exped. Force	1884-5	10,771	16	8	589	29
Chitral Relief Force	1895	5,213	14	5	1,531	50
N.W. Frontier, India	1897-8	5,741	90	32	2,393	63
South Africa ..	1899-1902	208,226	38	13	728	25

Authority—*Army Manual of Hygiene and Sanitation, 1934, p. 214.*

TABLE No. 3

DEATHS AMONGST FOREIGN TROOPS IN PREVIOUS WARS

Campaign	Duration	Average Strength (approx.)	Total Killed in Action and Died of Wounds	Killed in Action and Died of Wounds o/oo p.a.	Total Died of Disease	Died of Disease o/oo p.a.
Crimean War— French troops	1854-6	301,000	20,000	30·6	75,000	114·7
Franco-Prussian War— Prussian troops ..	1870-71	800,000	28,300	42·4	14,904	22·3
Russo-Jap. War— Japanese troops ..	1904-5	420,000	58,887	88·5	27,158	40·8
Russian troops ..		490,000	47,608	61·3	27,830	35·8

Authority—*Manual of Elementary Military Hygiene*, 1912, p. 79.

Crimean War. Another authority states that 98,100 British troops took the field in the Crimean War and gives the total deaths at 22,182 or 22½ per cent. of the strength, and the total wounded at 18,280. It is said that 29 per cent. of the French wounded died, and 30 per cent. of the men admitted to hospital for disease, whereas the British lost only 10 per cent. of wounded and 12 per cent. of men admitted for disease. At the same time only 71 per cent. of the French Army were admitted to hospital for disease, namely 225,000; whereas 147 per cent. of the British were so admitted; that is, the whole Army was admitted once and nearly half of it twice during the campaign, such admission reaching 144,400 or 46,000 more than the total strength.

The casualties in the Crimea as estimated by this authority (the reference is from the German *Sanitätsbericht*) were as follows:

TABLE No. 4

	English	French	Turkish	Russian	Total
Took Field	98,100	309,400	165,000	888,000	1,460,500
Killed in battle ..	2,755	8,490	10,100	30,600	51,945
Died of wounds ..	1,847	11,750	10,800	42,000	66,397
Died of sickness ..	17,580	75,375	24,500	374,000	491,455
Total Loss ..	22,182	95,615	45,400	446,000	609,797

FIGURES FOR THE FIRST WORLD WAR

Table 5 presents a statistical panorama of the experiences of the various powers in the First World War. Some of the figures are probably far from exact. The true extent of the Russian losses, for example, must largely remain conjectural; the Turkish figures are more so; and the large number recorded as "missing" in even the German, French and British official records reflects volumes of unwritten history—lonely deaths, mass-evacuations, "illegal absences", even clerical errors.

Some of the figures are obviously misleading; for example, the inclusion of 315 millions of Indians in the man-power resources of the British Empire. The fighting potential of the British Empire cannot, of course, be gauged by the statistics of the Army, since the influence of the Navy, even in Scapa Flow, was still more decisive.

It is supposed that from resources not available in Australia more complete and authentic figures can be obtained. Yet international statistics contain many surprises. For example in spite of the fact that the medical recordings for the French Army were organised by J. Bertillon, brother of the celebrated criminologist, no official publication known to the author deals with them; and in the American statistics, despite the immense size of the volume containing them, it has been found impossible to obtain or deduce such vital information as the proportion of battle and non-battle casualties that "*returned to duty*".

A study of British, French, American and German records, has made perfectly clear that strictly valid comparisons could only be made if the figures were available in each instance from the same clinical level in the scheme of evacuation—for example if figures were available for entry to or exit from the Regimental Aid Post, Field Ambulance Dressing Station, or Casualty Clearing Station of the British system, and at the corresponding stations in other armies. With the records available no such comparisons can be made. At best a rough judgment can be arrived at, and this not with full confidence as to its validity.

Moreover comparison is also grossly vitiated by the failure to deal systematically with "prisoners" and the large numbers recorded as "missing".²¹ Some of the totals are avowedly

²¹ The entry "prisoners" is properly a permanent, "missing" a wartime, category but the resolution of the latter is often imperfectly accomplished.

TABLE No. 5

TROOPS MOBILISED AND CASUALTIES IN THE WAR OF 1914-18

ALLIED NATIONS (cf. TABLE No. 10)

Nation	Population	Troops Mobilised	Troops took the Field	Killed and Died	Wounded less Died of Wounds	"Missing and Prisoners"	Total Battle Casualties	Ratio o/o of Total Battle Casualties to Troops Mobilised
British Empire ..	391,844,691	8,485,926	7,756,791	897,780	2,085,377	266,700	3,249,857	37.31
French Republic ..	39,700,000	8,194,150	—	1,457,000	2,300,000	478,000	4,235,000	51.68
Russia ..	182,182,600	15,123,000	—	664,890	3,813,827	3,950,000	8,428,717	55.73
Italy ..	36,546,437	5,615,000	—	650,000	947,000	600,000	2,197,000	39.13
United States ..	102,017,312	4,355,000	2,040,000†	51,666	234,300	4,500	290,406	6.44
Japan ..	78,152,244	800,000	—	300	907	3	1,210	0.15
Belgium ..	7,571,387	267,000	—	13,716	44,686	34,659	93,061	34.85
Serbia ..	4,615,567	707,343	—	45,000	133,148	152,958	331,106	46.81
Montenegro ..	436,789	50,000	—	3,000	10,000	7,000	20,000	40.00
Roumania† ..	7,508,009	750,000	—	335,706	120,000	86,000	535,706	71.43
Greece ..	4,821,300	261,890	—	5,000	21,000	1,000	27,000	10.31
Portugal ..	5,957,566	191,362*	109,229	7,222	13,751	12,318	33,291	17.40
Totals ..	861,353,902	44,800,671	—	4,131,220	9,723,996	5,587,138	19,442,354	43.39

CENTRAL POWERS

Germany ..	68,000,000	13,387,000	4,183,000	1,061,740	5,397,884	771,659	7,231,283	54.02
Austria ..	52,290,566	7,800,000	—	1,200,000	3,620,000	2,200,000	7,020,000	90.00
Turkey ..	21,273,900	2,850,000	—	325,000	400,000	250,000	975,000	34.21
Bulgaria ..	5,517,000	1,200,000	—	87,500	152,390	27,029	266,919	22.24
Totals ..	147,081,466	25,237,000	—	2,674,240	9,570,274	3,248,688	15,493,202	

Authorities: (a) British Empire—*Statistics of the Military Effort of the British Empire* (War Office, 1922), and *General Annual Reports on The British Army* (Cmd 1193 dated 1921). The British population includes 315,200,000 Indian subjects. (b) French Republic—Extract from *Revue Militaire Française*, April 1933, Article "Données Statistiques concernant la Guerre 1914-18",—Lt.-Col. Larcher; (figures for wounded taken from Mignon, *Le Service de Santé*, Vol. IV, p. 797). (c) Russia—*The Cost of the War to Russia*—Kohn and Meyendorff (Carnegie Endowment for International Peace). (d) Portugal—*Statistical Abstract of Information regarding Armies at Home or Abroad* (War Office, June 1920). (e) German—*Sanitätsbericht über das Deutsche Heer, 1914-18*. (f) Others—From *The World Almanac, 1935*—compiled by the U.S. War Department, corrected up to June 30, 1928. (g) Populations from *Commonwealth Year Book—1910-1918*.

* Excludes 10,500 natives. † Extract from *Statistical Abstract* (June, 1920).

approximations only. Furthermore, in some instances the several authorities appear to have obtained their figures from different sources. Indeed it is exceptional to find any two sets of figures that accord.

FRENCH STATISTICS

No official medical history of the French Medical Service has been written or statistics published. Why, is not clear for elaborate preparations were made by M. Bertillon. The figures in Table 6 are from *Le Service de Santé pendant la Guerre 1914-18* by Mignon. The figure for sick is taken from *Volume IV*, p. 797, and represents casualties "*qui sont passés aux gares régulatrices des armées*", the "*chiffre des évacués pour blessures et maladies*" totalling 3,025,613. Of the *immediate* battle casualties, killed on the field are placed at 68 per cent. of the total dead; of *remote*, "died of wounds or sickness" at 32 per cent. Of the total dead "killed and died of wounds" made up "87 or 88 per cent." of total deaths; those from sickness less than 14 per cent. The number of sick is accepted by him "allowing for errors" as 800,000—one might add "*quod erat absurdum*". It is difficult to see how these figures can be used as a basis for comparison with German or British figures.

It has been stated that in the French Army of every 100 casualties wounded or sick, one died, eight were permanently unfit, three were fit for home service, and 88 per cent. returned to duty of whom 62 were fit in one month and 26 within five months.²²

²² MacPhail *History of the Canadian Force: Medical Services* page 244. Quoting *Les Archives de la Guerre* (date not given). The relevant passages from Mignon's work are as follows:

Les sacrifices de la France:

- p 796. 675,700 tués, dénombrés sur le terrain;
225,300 disparus, présumés tués au feu;
250,000 décédés par suite de blessures;
175,000 décédés par suite de maladies.

p 797. Le chiffre des évacués pour blessures et maladies qui sont passés aux gares régulatrices des armées est de 3,025,613. Malgré que la discrimination n'ait pas été toujours parfaite entre les catégories d'évacués, on peut admettre qu'il y a en 2,300,000 blessés et 800,000 malades.

This writer estimates the national army losses (chiffre des morts) as follows:

France—Population 40 million: 1,325,000: 1 to 30.
Great Britain—42 million: 869,000: 1 to 42.
Italy—37 million: 404,000: 1 to 91.
U.S.A.—110 million: 51,000: 1 to 2,156.
Germany—67 million: 2,000,000: 1 to 35.
Austria-Hungary—49 million: 1,000,000: 1 to 50.
Russia—182 million: 1,700,000: 1 to 107 (Louis Marin).

TABLE No. 6

ANALYSIS OF FRENCH CASUALTIES

Troops Mobilised	Killed in Action	Died of Wounds	Died of Gas	Wounded	Gassed	Missing Presumed Dead	Prisoners of War	Total Battle Casualties	Died of Disease or Injury	Sick and Injured to "Interior"	Total Non-Battle Casualties	Total Casualties
8,410,000	674,700	250,000	*	2,300,000	*	225,300†	252,700‡	3,702,700	175,000	800,000	975,000	4,677,700

Authority—*Le Service de Santé Pendant la Guerre 1914-18, Tome IV*, by Médecin Inspecteur General A. Mignon. Paris, 1927.

* Separate figures for gassing casualties are not available. The proportion of gassed to other forms of wounding varied from 5-10 per cent. in 1916, 20-30 per cent. up to 40 per cent. in 1917-18: descending to 5 per cent. in the last five months of the war.

† Not included in second column.

‡ This figure is obtained by inference from Mignon's data and those of Lt-Col Larcher, *Revue Militaire Française, Avril-June, 1933*. *The War Finance of France*, Carnegie Endowment, 1927, p. 5 gives "Prisoners and Missing", as 453,500.

AMERICAN STATISTICS

The statistics of the American Army for the war of 1914-18 are presented as one of the fifteen volumes of the medical history. This volume (1,368 pages of Imperial Octavo) does not enable the untechnical observer to draw commonplace military conclusions (*e.g.* as to the proportion of wounded and sick returned to duty). Nor, though the work will doubtless be of immense value for those who have to provide for any similar military organisation, does it generally afford useful comparison with the known figures for other armies, since the battle experience of a large part of the American Expeditionary Force covered only a few months of the war, whereas their non-battle experience was probably three or four times as long and included the influenza pandemic.

GERMAN STATISTICS

Two sources of German medical statistics of the First World War are available in Australia:

(1) *Sanitätsbericht über das Deutsche Heer im Weltkriege 1914-18* (Report on the Health of the German Army in the World War), Volume III, published for the *Reichswehrministerium* in 1934; and (2) *Handbuch der Ärztlichen Erfahrungen im Weltkriege 1914-18* (Handbook of Medical Experience in the World War), edited by Professor Dr. Otto von Schjerning, published in 1922. (Schjerning was head of the Field Medical Organisation during the war.)

The former book is in the nature of an official history and has been relied on here except where the contrary is stated. The figures quoted appear not to extend beyond 31st July 1918, when the German statistics from field units came to an end. Professor Schjerning's volume is also highly authoritative and part of the figures here quoted extends to May 1919. As with other sources of statistics the figures from these two differ widely in some respects.

No reconciliation of them is attempted by the present writer; nor is it possible to make any exact comparison of German with

TABLE No. 7

AMERICAN EXPEDITIONARY FORCE OVERSEAS 1918

From the Official History of The Medical Department of the United States Army. Vol. XV, Part 2. Statistics.

Mean Strength A.E.F. (Annual 1918)	Battle Casualties							Total Battle Casualties	Non-Battle Casualties			Total Casualties
	Killed in Action	Died of Wounds	Died of Gas	Wounded Less Died of Wounds	Gassed	Missing	Prisoners of War		Died of Disease and Injury	Sick and Injured to Hospital	Total Non-Battle Casualties	
1,046,533	36,694	13,691	1,221	210,398	70,552	46	4,480	337,082	21,318 2,680	910,745 89,938	1,024,681	1,361,763
									23,998	1,000,683		

This table presents the experience of the American Expeditionary Force from the year 1918 only. The justification for this restriction is based on the following statement (*Official History Vol. XV, p. 1021*). "Practically all battle casualties occurred in 1918. Only 15 were reported killed in action and 60 as wounded in 1917. These have been arbitrarily charged to 1918 and the ratios calculated are based on annual mean strength of American Expeditionary Forces for 1918."

The total American casualties (Apr., 1917—Dec., 1919) are placed (*Vol. XV, p. 1183*) at 4,075,316—87.12 per thousand of troops. Of these 63,710 died of sickness or injury (15.43 per thousand), 3,515,464 were sick (85.12 per thousand), 299,059 (72.44 per thousand) injured. Of the total "non-battle casualties," no less than 265,826, with 37,422 deaths occurred within the United States.

The figures for Missing and Prisoners of War are quoted from *The War with Germany*, page 122, published by the War Department, United States.

British and Australian casualties. The categories, and the levels at which figures were recorded, are not parallel.²⁸

The main difficulty became evident when scientific attempts were made to compare the German losses at Verdun and First Somme (1916) with those of the Allies. At first sight, accepting the figures obtained for each country, for example, by the British Statistical Abstract published after the war ended, the disparity between German losses and those of the French and British in these battles was astonishing, the Allied casualties appearing to exceed those of the Germans in a very high proportion. A warning note was sounded by the British Official Historian, Sir James Edmonds, who on making preliminary calculations had found the figures not comparable, and eventually arrived at the opinion that there was little difference between British and German losses in the First Somme.

Sir James Edmonds summarised his conclusion in the following statement (in the *British Official History, France and Flanders, 1916, Volume I, pp. 496-7*):

An exact comparison of the Allied and German losses at the Somme is not possible owing to the different systems on which the casualty lists were compiled. There are available for the German two different sets of figures: one founded on the returns made by units in the field three times a month; and the other compiled since the war in the *Nachweiseamt* (Information Bureau), based on the nominal casualty lists (*Verlustliste*) published during the war. The former exclude wounded who were dealt with in the hospitals in the corps areas, and may be called the net losses. The latter not only include such lightly wounded, but men so lightly wounded that they did not leave their units, who are distinguished as "*l.v.b.d.Tr. (leicht verwundet bei der Truppe)*". These may be called the gross losses. The French also have two sets of figures. The British figures occupy an intermediate position between the two sets; they comprise all men reported absent from their units at a roll call after an engagement, and for days of battle like the 1st July 1916 include a number of absentees who subsequently reappeared. It has been mentioned in the Preface that for the 1st July those temporarily absent, recorded as

²⁸ An example is the terms *bei der Truppe* and *bei den Truppen*, as differentiating a particular group of casualties. It has been understood (on the advice of a former German Medical Officer) as relating to "Regimental" in contradistinction to "Medical" (*sanitäts*) establishment. By the German "regimental" system (a) a soldier, wherever he might be and to whichever unit he might for the time be attached, always belonged to his own *Regiment*. (b) Casualties treated within the system corresponding to the British "regimental" were officially recorded in a return provided to Army. In the British and Australian Army they were *not permanently recorded* in medical records though they were in the unit records. In the German Army the decision what cases could be treated *bei der Truppe* depended largely on the kind of warfare—in trench warfare in the west more cases could be so treated "*bei der Truppe*" than in the more active eastern campaign, where all casualties needing bed rest had to be sent to the field hospitals.

"missing", amounted to as much as 7½ per cent. over the actual losses. The British totals do not include lightly wounded who did not leave their units; the only official wounded are those who were treated at a casualty clearing station.

Thus to arrive at a comparison one must add something for the lightly wounded to the German net losses, or deduct something for the "*l.v.b.d.Tr.*" from the gross losses. Definite figures for the Somme period cannot be deduced from the published *Verlustliste*, for after about the middle of June 1916 the date and locality of a casualty were no longer given; from December 1916 the *Verlustliste* were printed alphabetically, with only name, rank, date and place of birth, and category of wound, and little can be learnt from them. The *Nachweiseamt* has stated that 497,000 German casualties were reported for the first time after the Armistice, and some proportion of them should be added to the Somme period. The German losses during the preliminary bombardment should also be added, but are not precisely known.

The French and German casualties at Verdun are more exactly comparable; and, as they give a valuable indication and confirmation, they may be stated here. Popular accounts have represented that the comparative losses of the French at Verdun were nearly "three to two German", and they were put during the war by the Germans as high as five to one.²⁴ Mr. W. S. Churchill in *The World Crisis* (Vol. iii., table opposite p. 52) gives from authoritative sources what must be the gross Verdun losses—as above defined—French, 535,000 and German 426,519. With the assistance of both the French Ministry of War and the German authorities, Herr Wendt²⁵ has investigated these casualties, and he gives the net totals as 362,000 French and 336,831 German for the period 21st February to 20th December 1916, and up to the 8th August, as 315,000 and 281,333;²⁶ that is to say the losses were not widely unequal.

The unadjusted figures for the battle of the Somme are: British 419,654, and French 194,451, both to 30th November, total 614,105,²⁷ and from the British total must be deducted some small percentage for the absentees who returned; the German are 445,322 (net to 30th December and excluding the 7 days' bombardment).²⁸ The *Nachweiseamt* gross figures for July-October only are 537,919. We have therefore for the Germans the following figures:

Verdun, gross 426,519; net 336,831.
Somme, gross 582,919;²⁹ net 437,322.³⁰

In the former case the lightly wounded account for 33 per cent. extra; in the latter, for 27 per cent.

To obtain some sort of comparison with the Allied total of 614,105

²⁴ *Revue d'Histoire de la Guerre Mondiale*, Apr. 1931, p. 183

²⁵ Wendt, pp. 242-3.

²⁶ Reference to the Ministry of War and the Reichsarchiv has confirmed his figures.

²⁷ British figures are from the returns of the Adjutant-General in France—the figures given in the *Statistics of the Military Effort of the British Empire during the Great War*, which are 498,054, are for the whole British front, for the period of the battle. The French figures were furnished by the Ministry of War (1931).

²⁸ Wendt, p. 176.

²⁹ *Nachweiseamt* gives 537,919 (without November, in which month the losses were according to Wendt, 45,000).

³⁰ Wendt gives 445,322 net (including December, in which month the losses according to him were 8,000) (Footnotes 24-30 belong to the quotation)

TABLE No. 8

GERMAN CASUALTIES (TO 31st JULY 1918)

	BATTLE CASUALTIES					NON-BATTLE CASUALTIES				Total Casualties	
	Killed in Action	Died of Wounds	Died of Gas*	Wounded Less Died of Wounds	Gassed*	Missing and Prisoners	Total Battle Casualties	Died of Disease or Injury†	Sick and Injured to Hospital		Total Non-Battle Casualties
Germany mobilised Troops, 13,387,000 ..	772,687	289,053		5,397,884		771,659	7,231,283		21,498,303	21,498,303	28,729,586
(Average strength Field Army 4,183,000, Army of Occupation — Besatzungsheer — 2,189,410).				Total includes about 80,000 gassed							

Authority—Official German History (*Sanitätsbericht*).

* German gas statistics are difficult to understand. Thus *Sanitätsbericht* (p. 175) states that from 1 January 1916 (when gas casualties were first discriminated from other wounds) to 31 July, 1918, 78,663 cases were reported, 2,000 were "estimated" for 1915. Elsewhere (p. 182) it is stated that 407,939 (64 per 1,000 of average strength), were admitted to field hospitals (*Lazarette*) for observation (*zur Beobachtung*). Of this number 83.5 per cent. were found "fit for duty", 0.15 per cent. died, 6.5 per cent. were unfit for service. It is stated that, for the whole war, of each 100 wounded gassing supplied, in the German army 4.6, in the English 9.72, in the French (last year only) 17.5, in the American 31.9.

† These appear to have totalled some 150,000. They are included in the total figures.

(less some percentage for temporary absentees included, of whom there were over 4,000 on the 1st July alone), there should be deducted from the 582,919 the *l.v.b.d.Tr.* and added to it the casualties during the Somme bombardment and a proportion of the 497,000 casualties not reported during the war. These three figures are indeterminate. We may, however, fairly assume that the real total is something under 600,000, just as the Allied total is something just over it. This is what might be expected. Our own infantry losses were very heavy, but the casualties of the better trained German infantry regiments engaged in the early days of the battle recorded in the footnotes in this volume show that exceedingly heavy losses were sustained by them also; Regiments (nominally 3,000) losing 2,832, 1,218, (out of 1,800), 1,714, 1,577, 1,215, 1,915, 2,147, 1,809 ("practically wiped out") and 2,641; and battalions of other regiments losing 620, 618, 701 ("annihilated"), and others reduced to 152, 138 and "under 200" men.

Furthermore, it is important to note that the German statistics here given *end on 31st July, 1918*. After that date records were confused and unreliable. During the war, regimental medical officers dealt with (*behandelten*) 27 million sick and wounded; 19,500,000—716 per thousand—in the field and 7,500,000—284 per thousand—at home (*in der Heimat*). Of these, only about half had gone to hospital (*kamen in die Lazarette*). Of every 1,000 men treated, 209 were wounded, 791 sick. During the war 40 per cent. had not been evacuated, 60 per cent. had been "lost to the Army". Of the latter 30 per cent. had recovered, 30 per cent. had been permanently lost—killed or died, missing, invalided, or not fit for line service.

The following figures taken from Professor von Schjerning's *Handbook of Medical Experience in the World War* are of interest.⁸¹

RETURN TO DUTY FROM HOSPITAL IN THE GERMAN ARMY, NOT INCLUDING ARMY OF OCCUPATION

1st Year (2.8.14-31.7.15)	..	..	..	..	88.7 per cent.
2nd Year (1.8.15-31.7.16)	..	..	..	..	91.3 per cent.
3rd Year (1.8.16-31.7.17)	..	..	..	..	91.8 per cent.
4th Year (1.8.17-31.7.18)	..	..	..	..	92.8 per cent.

"Duty" included other than front line duty

⁸¹ Vol. I (Surgery) Part I, Introduction, pp. x and xi. cf. also *Sanitätsbericht*, Vol. III, p. 9. In making comparisons with British and other figures (e.g. with those given in Table 45) it is very interesting to note that the rates per thousand of strength for sickness given in the German Histories very greatly exceed that of the A.I.F. The explanation of this opens up an important feature in the German methods of treating the sick and wounded. It is apparently to be found in the fact that the German figures include men treated *bei der Truppe*—i.e., in the Regimental posts, etc., whereas the A.I.F. figures are only for men evacuated to Army Medical Units—i.e. Field Ambulances. If the Australian regimental figures were included the numbers would be much greater. See e.g. Vol. I, p. 349, and Vol. II, Table p. 529.

For the same four years the numbers of sick and injured were:

	Average strength of German Army	Sick	Per 1,000 of average strength
1st Year	2,577,126	3,942,904	1530·0
2nd Year	4,135,853	4,915,663	1188·5
3rd Year	4,989,739	5,043,730	1010·8
4th Year	5,028,161	5,558,967	1105·6
Total sick to 31st July, 1918 ..		19,461,264	

CASUALTIES, TO END OF MAY, 1919

Killed	1,531,048
Missing	991,340
Wounded	4,211,469
	6,733,857
Died of disease	155,013
Total	6,888,870
Deaths totalled	1,686,061

According to the *Sanitätsbericht*, of the 289,053 who died of wounds there died *Bei der Truppe*, in the Field Army, 61,204; in the Field Hospitals (*Feldlazarette*) 181,817; in the Reserve Hospitals of the Army of Occupation (*Besatzungsheer*) 45,532.

Another table from the *Sanitätsbericht* gives the following ratios of men made fit for duty at the various levels of evacuation. (In this case the number of wounded handled is given at 5,320,655—the differences are not explained.)

Made fit for service.

Handled <i>Bei der Truppe</i> ..	1,309,495	=	246·1	per 1,000
„ In Field Hospitals ..	689,726	=	129·6	„ „
„ In Reserve Hospitals—				
At the Front ..	1,669,372	=	313·8	„ „
At Home ..	1,018,433	=	191·4	„ „
Total ..	4,687,026	=	880·9	„ „
Died of Wounds	289,053	=	54·3	„ „
Unfit for Service	344,576	=	64·8	„ „
	5,320,655	=	1,000·0	

Sir John Gellibrand, by whom the writer has been greatly helped in dealing with the German statistical volume writes :

Of 100 soldiers of the German Field Army in 4 years to 31.7.1918 :

- 40 were not sick or wounded (or only slightly).
- 60 had to be replaced by
 - 30 men returned to duty from hospital, and
 - 30 reinforcements, who took the place of
 - 7½ men whose deaths were due to action
 - 3½ whose deaths were due to disease
 - 7 missing
 - 6 who became unfit for any duty
 - 6 who became fit for home service only.

Or of 1,000 battle casualties who suffered wounds

- 138.3 were killed in action
- 11.0 died in field units
- 39.7 died in hospitals in the field
- 8.1 died in reserve hospitals
- 61.7 were discharged unfit
- 604.5 returned to duty.

A figure of men made fit for "return to duty" after *sickness* is difficult to arrive at though rates for individual diseases are given. These vary from 38.4 per cent. for tuberculosis to 94.5 per cent. for measles. No valid comparison can be made here between British and German experiences.

That both the medical system in the German Army and the German Medical Service were exceedingly efficient is shown by the results—especially from the figures for **The German Army** "return to duty" after wounds. Apparently the German success was largely due to the importance placed on exact classification of patients in accordance with functional ability, as estimated by medical experts, together with a well organised system of "garrison duty" (in the *Besatzungsheer*) corresponding broadly to the British system of "B" class and "C" class duty. In the Australian force (as has been seen),³² "C" class and even "B" class men were practically eliminated. In any war in which Australia was fully "up against it", such an exemption of partly disabled men would not be possible.

Another important feature was the division of the medical system into spheres of organisation and administration—the Regimental (*bei der Truppe*) and the Medical (*Sanitäts*). In

³² See Vol. II, pp. 845-50, and 855.

this way men temporarily unfit for duty were retained in the zone of the field units, and only passed to the "Medical Service" (*Sanitäts*) when, either from the seriousness of the casualty or the exigencies of warfare, it was necessary to unload the regimental system.

TABLE No. 9

TURKEY

Total Battle Casualties	..	..	..	948,447
Total Non-Battle Casualties	..	..	..	3,967,000
Ratio of Battle to Non-Battle Casualties	..	..	..	1 to 4.18

467,000 died of disease. The percentage of deaths in some of the prevalent diseases was as follows:

Malaria	..	..	..	461,799 cases	23,351 deaths	5.0 per cent.
Dysentery	..	..	..	147,000	" 40,000	" 27.2 " "
Intermittent Fevers	..	..	..	103,000	" 4,000	" 3.9 " "
Typhus	..	..	..	93,000	" 26,000	" 27.9 " "
Syphilis	..	..	..	27,000	" 150	" 0.55 " "

Extracted from *Turkey in the World War* (Carnegie Endowment for International Peace), p. 253.

III

GENERAL STATISTICS OF AUSTRALIAN ENLISTMENTS AND CASUALTIES

The Australian statistics in this and subsequent parts relate to: (1) the raising of the Australian Imperial Force and its maintenance as to *strength* (*Tables 11-24*). (2) Casualty experiences of the force as a whole (*Tables 25-34*). (3) The particular problems associated with the maintenance of strength on the Western Front (*Tables 35-52*). (4) A pathogenic analysis of the clinical experiences of the force on the Western Front (*Tables 53-59*). (5) Figures which embody the total experience—excursion and repatriation of the A.I.F. (*Table 60*). (6) The problems of the Aftermath (*Tables 61-72*).

Major Mitchell, in the *British Official Medical History*,³³ has explained the value of statistics such as these. He is quoted here on the fundamental importance of *strength*:

Herein lies the importance of these tables of strengths to administrative medical officers. In the first place, they are given some idea of the expansion of the forces, not only in the actual theatres of operation

³³ *Casualties and Medical Statistics*, p. 8.

TABLE No. 10

FORCES OF BRITISH EMPIRE IN THE GREAT WAR—1914-18

	Population ¹		Troops ¹¹						Some Percentages	
	Year		Raised	Took the Field	Killed and Died of Wounds	Wounded Less Died of Wounds	Number Reported Prisoners	Total Battle Casualties	Troops Took the Field to Population	Battle Casualties to Took the Field
United Kingdom ..	1916	48,089,249	5,704,416	5,399,563	702,410	1,662,625	170,389	2,535,424	11.2	47.1
Canada ..	1917	8,361,000	628,964	422,405	56,625	149,732	3,720	210,086	5.0	42.7
Australia ..	1916	4,875,325	416,809	331,781	59,342	152,171	4,084	215,045	6.8	64.8
New Zealand	1916	1,099,449	128,525	98,950	16,654	41,317	530	58,501	8.9	58.6
South Africa ..	1916	6,685,827	136,070 ¹¹	136,070	6,928	11,444	228	18,600	2.0	13.6
Newfoundland	1918	254,587	11,922	10,619	1,195	2,314	152	3,661	4.2	34.5
India ..	1916	315,200,000	1,440,437	1,338,620	53,486	64,350	3,762	121,598	0.4	9.1
Fed. Malay States ..	1918	820,871	1,000 ^{1v}	1,000	103	290	40	433	0.1	43.3
West Indies ..	1916	1,772,000 ^v	15,601 ^v	15,601	1,256	697	—	1,953	0.09	12.5
Ceylon ..	1918	4,686,383 ^v	2,182 ^v	2,182	333	437	—	770	—	35.3
Totals ..		391,844,691	8,485,926	7,756,791	897,780	2,085,377	182,914	3,166,071	8.3 ¹¹	47.4 ¹

¹ Population taken from *Commonwealth Year Book* (1910-1918) unless otherwise stated.

¹¹ Statistics re troops are taken from *Statistics of Military Effort of the British Empire during the Great War*, p. 237 (War Office, March 1922) unless otherwise stated. The War Office table purports to comprise killed in action, died of wounds or as prisoners of war, and missing whose deaths had been accepted on 31st December, 1920. Evidence from other sources proves, however, that in some instances figures include also deaths from disease and injury. South African experience includes the almost bloodless African campaigns.

^{1v} Excludes 92,837 coloured troops. ^v Estimate only. Taken from *Empire at War* (Vol. V) by Sir Charles Lucas. ¹ Less India.

Note: Like all other general statistics of the war, these figures should be taken as approximate.

but also at home, for which advice was required in regard to problems on recruiting, training, billeting, rationing, clothing, prevention of disease, medical attendance, evacuation, hospital accommodation, invaliding, training of convalescents and the return to duty of men discharged from hospital.

Secondly, it is essential to have a basis of calculation upon which to work when estimating, both in our own and the enemy's forces, the probable numbers of sick, deaths, invalids, evacuations overseas and returned to duty.³⁴ The lack of a reliable formula on which these calculations could be based was a great handicap during the late war.

The general policy adopted in the present work in presenting the casualties of the war is a compromise between the usage which adheres strictly to matters of purely medical concern,³⁵ and that—adopted in the *British Official Medical History*—where the writer sets himself deliberately to serve the requirements of the General Staff.³⁶ In this work while these latter are kept in mind, and “missing” and “prisoners of war” are included in the figures for battle casualties, the responsibilities of the medical service have the first consideration. This policy is illustrated by the place allotted to “died of wounds”: in the American statistical volume they are not mentioned; in the British they are placed with killed (*i.e.* “killed and died of wounds”); here, except where otherwise indicated, they are put with wounded (“wounded and died of wounds”).

Though the number of men enlisted (*i.e.* “attested”) is known, the total number volunteering and medically examined can only be ascertained approximately. In consequence the important figure of the *proportion of males unfit for military service* under the standards laid down for service in the A.I.F. cannot be exactly ascertained. By estimation from partial and analogous records, however, an approximate figure has been accepted as sufficiently accurate for the purpose of the following tables.

³⁴ German usage as applied in the *Sanitätsbericht* distinguishes “*Iststärke*” (actual strength) the equivalent of the British “ration strength” as returned daily in the field on Army Form B.213; and “*Sollstärke*” (proper strength), the equivalent of the British term “Establishment”.

³⁵ Typically the American. *Vide The Medical Department of the United States Army in the World War. Vol. XV. Statistics.*

³⁶ The procedure is thus set out in *Statistics Volume, Introduction, p. xvi*. “In dealing with casualties a classification has been used which is as yet unfamiliar, but which seems to be the most suitable. They have been divided into ‘battle’ and ‘non-battle’ casualties and each group has been further subdivided into ‘permanent’ and ‘temporary’ losses for military purposes in the field’. The term ‘battle casualties’ includes killed, missing, prisoners of war, and those who suffered injury caused by or arising from enemy action. . . . ‘Non-battle casualties’ include all cases of sickness or injury independent of any act of the enemy.”

TABLE NO. II

AUSTRALIAN FORCES—ENLISTMENTS AND EMBARKATIONS 1914-18

(Including Munition Workers sent Oversea)

	A.I.F. ¹	A.N. and M.E.F. ¹¹	A.A.N.S.	Munition Workers	R.A.N.
Enlisted ..	412,953	3,651	2,861		Seagoing 5,050 ^v
Embarked .	331,781	3,011	2,139 ¹¹¹	5,200 ^{1v}	Other services 3,093

¹ Includes Air Force.¹¹ Infantry only. Includes the "Tropical Force".¹¹¹ Not including 129 (Q.A.I.M.N.S.) volunteers for Nursing Service in England.^{1v} Under official auspices, the total munition and other workers sent to Great Britain was not less than 6,000 men.^v Not including 52 cadets of R.A.N. College, Jervis Bay who were sent in 1917-18 to the Grand Fleet.

The strength of the Royal Australian Navy in 1918 was:

R.A.N. ..	..	..	..	..	4,225	} = 5,050
R.N. (on loan)	..	..	..	..	825	
R.A.N. Brigade	..	..	..	..
						3,093
						8,143

Authority: Figures shown in columns 1, 2, 3, are from Base Records; in column 4 from Vol. XI—*Official History of the War 1914-18* (Scott).

Figures relating to the R.A.N. are from Appendix No. 5, Vol. IX—*Official History of Australia in the War of 1914-18* (Jose).

TABLE NO. I2

DESTINATION, ULTIMATE DISPOSAL, ETC. OF RECRUITS

Medically examined ..	..	..	..	..	589,947
Rejected ..	..	..	..	..	178,800
Enlisted ..	..	..	..	..	416,809
Died, discharged, or for other reasons did not leave ..					
Australia ..	..	..	..	..	83,084
Sailed with A.I.F. ..	..	..	..	..	330,714
Sailed with A.N. and M.E.F. ..	..	..	..	..	3,011

The causes that prevented 83,084 enlisted men from leaving Australia were as follows:

Discharged medically unfit from camps ..	..	..	33,906
Under age, family or other reasons ..	..	..	9,522
Desertion or services no longer required ³⁷ ..	..	..	18,792
Cessation of hostilities ..	..	..	13,954
Died of disease or other causes ..	..	..	939
Others ..	..	..	5,971
			83,084 ³⁸

³⁷ Discharge because "services are no longer required" was a very valuable power in the hands of the G.O.C., A.I.F., for removing officers or men from the A.I.F. without stating a reason.

³⁸ It is important to note that enlistments do not represent individuals, as multiple enlistments were common among certain classes of men who were unfit or for other reasons resorted to impersonation or misstatements at enrolments.

The fate of the 330,714 soldiers embarked was as follows:

Died, discharged, etc.	..	..	..	66,341
Returned to Australia, fit	..	..	..	151,003
Returned to Australia, unfit	..	..	..	113,370
Total returned (approximate figure)				<u>264,373</u>

The general "fitness" of Australia's male population for war-like enterprises may be indicated by the following figures, for the medical examination carried out *yearly* for

A comparison: (1) enlistment in the Permanent Australian Militia (volunteers) and Citizen Force (conscripted) Military Forces, (2) admission to the Royal Military College, and (3) on enlistment from 1912 to 1928 under the Universal (Compulsory) Training Scheme, and from 1930-1938 (during which time compulsion was abandoned) in the voluntary militia..

The writer has no hesitation in condemning as a serious neglect of duty to the nation the failure of Australian National Governments (for financial reasons) to use the unique opportunity for ascertaining both the extent and the causes leading to the development of "unfitness" in the Australian male population by analysing the statistical cards which recorded the findings of the annual medical examination of the "Senior Cadets"—boys from 16 to 18 years. These cards have been destroyed.³⁹

TABLE No. 13

RESULT OF MEDICAL EXAMINATIONS FOR MILITARY SERVICE, A.M.F., 1912-38

Period	For Permanent Military Forces		For Royal Military College		For Militia Forces	
	Average number examined	Percentage rejected	Average number examined	Percentage rejected	Average Quota or number examined	Percentage Unfit or Temporarily Unfit
1912-1929 incl.	588	62.58	39	35.06	21,141 ¹	22.21
1930-1938 incl.	489	37.12	109	45.31	9,122	3.79

¹ At 18 years of age.

³⁹ As an Area Medical Officer under the scheme of universal training the writer can testify to the great potential value and interest, medical and social, of the data available through these examinations, to which he drew attention before the war.

TABLE No. 14

DESTINATION OF RECRUITS FOR A.I.F. AND A.N. AND M.E.F. ANALYSED BY STATES
(Shown in round figures)

Military District	State	Recruits Examined	Rejected	Enlisted	Did not Embark	Embarkations	Died or Discharged Abroad	Returned to Australia
No. 1	Queensland	82,400	24,700	57,700	12,160	45,540	10,200	39,500
No. 2	New South Wales	234,300	70,300	164,000	33,980	130,020	22,800	90,600
No. 3	Victoria	166,600	48,200	112,400	23,300	89,100	19,000	77,900
No. 4	South Australia	49,900	15,000	35,000	7,280	27,720	6,000	24,900
No. 5	Western Australia	46,000	13,800	32,200	6,790	25,410	6,800	23,700
No. 6	Tasmania	22,100	6,600	15,500	3,290	12,210	2,700	9,700
		595,300	178,600	416,800	86,800	330,000	67,500	266,300

The drop in the rate of rejection from 22 per cent. to 3.79 per cent. when the method of enlistment changed from compulsion to volunteering is striking. The experience of Great Britain as to the margin of unfits is stated as follows:

A careful investigation of the figures for Great Britain shows that the proportion of men aged from 18 to 41, both inclusive, who are fit to be placed in Category "A" is about 25 per cent. of the total male population, while the number of men of the same ages fit for other military service is roughly 15 per cent.

It may be estimated that in white communities the proportion of males reaching the age of 18 in any one year is 2 per cent. of the total male population surviving in that year. Of the youths thus annually becoming available, about 66 per cent. may be taken as fit for Category "A" and 30 per cent. for other military service.⁴⁰

TABLE NO. 15

RECRUITS—AVERAGE NUMBERS IN A.I.F. TRAINING
CAMPS IN AUSTRALIA, 1914-18

	1st M.D.	2nd M.D.	3rd M.D.	4th M.D.	5th M.D.	6th M.D.	Total
<i>1914</i>							
Period Sept.- Dec. . . .	1,251	3,816	5,960	1,113	1,700	292	14,132
<i>1915</i>							
1st Half-year	3,564	6,215	7,841	2,495	1,483	429	22,027
2nd Half-year	7,382	16,063	21,754	5,112	3,428	1,259	54,998
<i>1916</i>							
1st Half-year	10,298	18,958	16,346	5,063	5,195	1,392	57,252
2nd Half-year	5,717	11,605	7,816	2,699	4,069	1,101	33,007
<i>1917</i>							
1st Half-year	2,346	5,096	5,416	1,617	2,022	912	17,409
2nd Half-year	1,008	4,885	5,068	1,262	853	365	13,441
<i>1918</i>							
1st Half-year	795	3,487	2,484	752	536	312	8,366
Period July- Nov. . .	600	3,478	2,465	432	432	324	7,731

Sickness in Camps. Complete statistics of sickness in training camps in Australia⁴¹ are not available⁴² but the figures for

⁴⁰ Extract from *Statistical Abstract of Information regarding Armies at Home or Abroad* (War Office, June, 1920). p. 379.

⁴¹ See Vol. II, Chap. xvi.

⁴² No definite strength of camp hospitals was laid down and the records of the several military districts varied greatly in accuracy and in the care with which they were rendered. Little control was maintained from Headquarters of Defence. As a consequence, no data were available for guidance at the outbreak of the Second World War in 1939. It is not impertinent to note that those responsible for the next war will, under present arrangements (1940), be even worse off!

1915-16 and 1916-17 are analysed below⁴³ in *Table 16* wherein a two years' "sample" has been assembled of camp experience from June 1915 to June 1917. The experience may be held fairly to reflect that for the whole period of the war.

TABLE No. 16

CAUSES FOR ADMISSIONS TO CAMP HOSPITALS IN AUSTRALIA DURING 1915-16 AND 1916-17, AND PERCENTAGE OF NUMBERS IN CAMP TO THE YEARLY TOTAL

Diseases	1915-16		1916-17	
	Number of Cases	Percentage	Number of Cases	Percentage
Injuries	2,814	1·3473	2,191	1·8499
Poisons (<i>sic</i>) ..	130	0·0622	51	0·0431
Heat Apoplexy ..	45	0·0215	23	0·0194
Enteric	81	0·0388	11	0·0093
Continued Fever ..	94	0·0450	—	—
Dysentery	48	0·0230	32	0·0070
Epidemic Diarrhoea	61	0·0292	1	0·0008
Diphtheria	118	0·0565	80	0·0675
Tonsillitis	1,659	0·7943	1,018	0·8595
Scarlet Fever ..	41	0·0196	21	0·0177
Cerebro-spinal Meningitis ..	530	0·2537	154	0·1300
Influenza	13,999	6·7023	6,500	5·4880
Measles	5,240	2·5116	1,559	1·3163
Mumps	645	0·3088	972	0·8207
Rheumatic Fever ..	46	0·0220	1	0·0008
Bronchitis	811	0·3883	602	0·5083
Pneumonia	323	0·1546	186	0·1571
Pleurisy	317	0·1518	150	0·1267
Tubercular Diseases	90	0·0431	82	0·0692
Erysipelas	15	0·0072	5	0·0042
Septicaemia	5	0·0024	9	0·0076
Venereal Disease ..	6,796	3·2537	4,434 ¹	3·7437
Malaria	35	0·0168	39	0·0329
Remittent Fever ..	—	—	32	0·0270
Intermittent Fever ..	45	0·0215	36	0·0304
Dengue	430	0·2059	45	0·0380
Plague	—	—	1	0·0008
Conjunctivitis ..	261	0·1250	102	0·0861
Other Diseases of the Eye	404	0·1934	403	0·3402

⁴³ The deaths among recruits in camp during the war are given later with the general clinical analysis. The classification here follows the returns. (Through inadvertence, four places of decimals were retained.)

Diseases	1915-16		1916-17	
	Number of Cases	Percentage	Number of Cases	Percentage
Diseases of the Respiratory System	1,442	0·6904	1,279	1·0799
Diarrhoea	909	0·4352	478	0·4036
Inflammation of Intestine	254	0·1216	213	0·1798
Congestion of Liver	3	0·0014	13	0·0110
Jaundice	28	0·0134	12	0·0101
Other Digestive Diseases	659	0·3155	553	0·4669
Diseases of the Nervous System	373	0·1786	291	0·2457
D.A.H.	155	0·0742	169	0·1427
Alcoholism	234	0·1120	126	0·1064
Rheumatism	931	0·4457	804	0·6788
Disorders of the Circulatory System	456	0·2183	325	0·2744
Diseases of the Urinary System	399	0·1910	193	0·1630
Other Local Diseases	6,073	2·9076	5,136	4·3364
Other General Diseases	3,864	1·8500	2,879	2·4308
"Not Yet Diagnosed"	1,788	0·8560	2,453	2·0711
Total	52,657	25·2104	33,664	28·4228

¹ V.D. 1916-17: Gonorrhoea 3,571 (3·0150)
 Syphilis 742 (0·6265)
 Chancroids 121 (0·1022)

Figures are not separated for 1915-16.

4,434 (3·7437)

Note that the above percentages do *not* relate to the average number of men in camp but to the year's total. The actual figures are shown hereunder:

Number of men in camps at 30 June, 1915	16,424
Number of enlistments, year ended 30 June, 1916	192,446
Total 1915-16	208,870
Number of men in camps as at 30 June, 1916	50,019
Number of enlistments, year ended 30 June, 1917	68,421
Total 1916-17	118,440

Though any complete examination of the results of the medical examination of recruits is precluded by absence of material, there is available a limited experience which provides

material for more exact study. The data were provided by the "call up" in 1916 when (in accordance with the provision of the *Defence Act*, that every male Australian between 18 and 60 years of age could be called upon for military service in Australia) all men between 21 and 35 were required to report for medical examination. *Table No. 17* shows the number of men who reported under the Proclamation of 29th September, 1916, for medical examination. Examining officers were interested to find that, whereas in voluntary recruiting for the A.I.F. they were constantly troubled by attempted impersonation in order to enter the force and by men who tried to "get past the doctor" after multiple rejections,⁴⁴ the precise opposite was now the case. Medical officers had to meet the determined, and very effective endeavours of a large number of "fit" Australians to prove that they were "unfit" for service.⁴⁵ The general experience of the medical examiners is reflected statistically in the fact that out of 191,610 men who reported, 87,525 applications for exemption were lodged, that is, 46 per cent. Many men, indeed, after passing the examination lodged protests averring that they suffered from infirmities which the military medical officers had failed to discern. The rejections (*i.e.* those classed as unfit, doubtful, and temporarily unfit)—37 per cent. compared with 30 for voluntary recruits—certainly reflects "moral" factors noted above, rather than any considerable difference in the type of man who volunteered.⁴⁶

It must, however, be remembered that the "call up" in 1916 was largely a political move in a bitter political campaign; the results cannot therefore be taken to represent simply the reaction of that residue of the male population to a call based on the nation's need. A comparison with the "call up" in the Second World War would be of greater interest.

TABLE NO. 17

THE CALL UP, OCTOBER 1916

Number Medically Examined, Rejected, Passed, Etc.						
Number reported	..	..	..	..	..	191,610
Medically examined	..	..	..	..	..	180,715

⁴⁴ Too often with the unintended result of swelling the toll of "unfits" and of pensions and greatly hampering the national cause.

⁴⁵ *Vol. II, Chap. xvi* and *Vol. XI of the Official History*

⁴⁶ The actual difference in the proportion of rejections was certainly greater since multiple rejections did not occur in the "call up".

Found fit	114,322
Found unfit	49,138
Went in training	36,923
Joined the A.I.F.	4,810
Of those called up—	
Applied for exemption	87,525
Exemption granted to	48,736

TABLE NO. 18

MEDICAL EXAMINATIONS IN THE CALL UP, BY STATES

M.D.	Reported	Examined	Fit	Unfit	Doubtful	Temporarily Unfit	Percentage Fit for Active Service
1st ..	33,925	32,876	21,836	8,335	1,676	1,029	66
2nd ..	69,210	59,837	36,860	17,066	2,347	3,564	61
3rd ..	54,846	54,678	33,805	14,955	3,631	2,287	60
4th ..	18,687	18,416	13,118	3,832	659	807	71
5th ..	8,631	8,601	4,589	3,121	480	411	53
6th ..	6,311	6,307	4,114	1,829	202	162	65
	191,610	180,715	114,322	49,138	8,995	8,260	63

Reverting to the voluntary forces for oversea service, the following table shows the rise and fall in enlistment with the slightly delayed effect on embarkation.

TABLE NO. 19

MILITARY FORCES FOR OVERSEA—ENLISTMENTS AND EMBARKATIONS BY YEARS

Year ended 31st December	Enlistments	Embarkations		Deaths Among Recruits in Australia	Depot Discharges	Strength in Australian Training Camps at 31st December
		A.I.F.	A.N. and M.E.F.			
1914 ..	52,561	31,636	1,450	26	4,190	15,259
1915 ..	165,912	98,328	655	446	33,122	48,620
1916 ..	124,352	139,015	248	383	14,738	18,588
1917 ..	45,101	43,094	93	58	13,308	8,136
1918 ..	28,883	18,614	391	26	9,546	7,442
1919 ..	—	27	174	—	7,241	—
	416,809	330,714	3,011	939	82,145	

Authority: Base Records, count in year 1924.

TABLE No. 20

PROPORTION OF ENLISTMENTS TO STATE POPULATIONS

Military District	Total Enlisted	Percentage Enlisted	Approximate Ratio per cent. of Enlistments	
			To Total Population	To Males aged 18-44
1st M.D. ..	57,705	13.84	8.5	37.7
2nd M.D. ..	164,030	39.36	8.8	39.8
3rd M.D. ..	112,399	26.96	7.9	38.6
4th M.D. ..	34,959	8.39	8.0	37.6
5th M.D. ..	32,231	7.73	9.9	37.5
6th M.D. ..	15,485	3.72	7.9	37.8
	416,809	100.00	8.5	38.7

It is to be noted that boundaries of States and Military Districts are not quite identical, part of N.S.W. being in the 1st M.D. and part in the 4th.

TABLE No. 21

SOCIAL COMPOSITION OF A.I.F. EMBARKED

	A.I.F. Embarked	Percentage of Total Embarked		A.I.F. Embarked	Percentage of Total Embarked
<i>Age</i>			<i>Occupation</i>		
18 years ..	20,697	6.26	Tradesmen ..	112,452	34.00
19 years ..	27,271	8.25	Labourers ..	99,252	30.00
20 years ..	24,651	7.45	Country call-		
21 to 30 years	186,731	56.45	ings ..	57,430	17.36
31 to 40 years	56,076	16.96	Clerical ..	24,346	7.36
41 and over ..	15,344	4.63	Professional ..	15,719	4.75
			Miscellaneous ..	12,878	3.89
			Seafaring ..	6,562	1.98
			Nurses ..	2,131	0.64
	330,770	100.00		330,770	99.98
<i>Religions</i>			<i>Conjugal condition</i>		
Church of Eng-			Single ..	270,005	81.62
land ..	162,814	49.22	Married ..	57,496	17.38
Roman Catholic	63,705	19.26	Widowers ..	2,709	0.84
Presbyterian ..	49,631	15.01	Unknown ..	560	0.16
Methodist ..	33,706	10.19			
Jewish ..	1,214	0.37			
Others ..	19,700	5.96			
	330,770	100.00		330,770	100.00

The figure 330,770 includes 56 who were allowed to enlist oversea; the A.N. and M.E.F. is not included. Some discrepancies in this figure cannot be avoided.

TABLE No. 22

DISPOSAL OF THE A.I.F. OVERSEA

Year	Embarkations			Deaths Abroad	Dis- charg- ed Abroad	Returned to Aus- tralia	Total	Strength of A.I.F.	Year
	Officers and Other Ranks	Nurses	Total						
1914	31,444	192	31,636	14	—	6	20	31,616	1914
1915	96,779	549	97,328	8,474	150	8,452	17,076	111,868	1915
1916	139,592	423	140,015	13,696	350	15,901	29,947	221,936	1916
1917	42,303	791	43,094	21,736	762	26,047	48,545	216,485	1917
1918	18,438	176	18,614	14,240	672	42,420	57,332	177,767	1918
1919	27		27	624	3,504	161,379	165,507	12,287	1919
1920				6	1,668	10,054	11,728	559	1920
1921- 1922				—	205	114	319	—	1921- 1922
Total 328,583 2,131 330,714 58,790 7,311 264,373 330,474 —									
Enlisted Abroad .. 56 Returned to Aus- tralia at own ex- pense 296									
							<u>330,770</u>		
							<u>330,770</u>		

Of the 7,311 "Discharged Abroad" 902 were "illegal absentees", 1,151 were "medically unfit", 21 were members of the A.N. and M.E.F. who stayed in New Guinea. "Others" men who for business or social reasons elected to remain abroad, chiefly in Great Britain, France and America. Partly through utilisation of the Base Records Department, partly through a "prodigal son" or even "deathbed" repentance the number of "illegal absentees" has (1940) been reduced to 750, and this figure is the only entry under "Missing" that has been allowed to remain in A.I.F. records.

The total strength of the A.I.F. abroad on the last day of each year is given by Base Records as follows:

31 December	1915	..	..	..	..	..	96,484
"	"	1916	..	..	..	..	204,220
"	"	1917	..	..	..	..	214,504
"	"	1918	..	..	..	..	167,198

It is important to note that the above figures, which include large numbers in hospital, in depots and on transports do not indicate the strength of the A.I.F. at any time in the field, which is given in *Table No. 23*.

TABLE No. 23

AVERAGE STRENGTH AND LOCATION OF THE A.I.F. IN AUSTRALIA AND ABROAD EACH YEAR 1914-1920

Year	In Camps in Australia	Gallipoli M.E.F.	Egypt and Palestine E.E.F.	Mesopotamia M.E.F.	France and Flanders B.E.F.	United Kingdom	Other Places and En Route	Average Strength Abroad	Year
1914	14,094	—	—	—	—	—	—	—	1914
1915	38,513	27,075	33,575	—	586	5,000	10,000	72,236	1915
1916	45,138	—	42,424	118	59,978	35,000	29,871	167,391	1916
1917	15,433	—	16,469	237	118,454	66,792	17,191	219,143	1917
1918	8,078	—	18,050	312	110,031	55,536	13,080	197,009	1918
1919	—	—	9,995	239	22,801	35,912	25,969	94,916	1919
1920	—	—	—	—	71	3,824	2,418	6,313	1920

The "A.I.F." officially includes all men attested after medical examination.

The figure for the A.I.F. in France and Flanders in 1916 gives no indication of the number of troops present on that front at any one time, since the I Anzac Corps did not arrive there till April or the II Anzac Corps till 2-3 months later. The average number maintained during the second half of that year was therefore very much higher.

A general deduction from the figures for the Western Front is that during the period of active operations in France and Flanders, for every three "effectives" at the front at any time approximately two men were in hospital or depots in the United Kingdom.

TABLE No. 24

AVERAGE STRENGTH OF A.I.F. IN EACH THEATRE OF WAR AND IN ENGLAND

(The average for the months of January, April, July and October in each year is shown)¹

Year	M.E.F.	E.E.F.	B.E.F.	U.K.
1915:				
January	20,500	—	—	600
April	39,000	—	—	600
July	54,000	—	266	2,500
October	69,000	—	645	7,500

¹ Figures are from the Paymaster's records. The corresponding numbers given in Table 52 are on specific dates. Numbers for M.E.F. and for U.K. in 1915 are available only in round figures.

Year	M.E.F.	E.E.F.	B.E.F.	U.K.
<i>1916:</i>				
January	22,500	77,193	644	10,570
April	—	64,284	40,801	6,863
July	—	24,805	91,649	90,227
October	—	15,511	88,244	90,504
<i>1917:</i>				
January	—	15,122	117,219	67,013
April	—	15,882	119,690	80,778
July	—	17,264	121,259	66,875
October	—	17,293	116,249	56,422
<i>1918:</i>				
January	—	18,506	116,969	59,390
April	—	18,163	121,875	50,347
July	—	18,958	114,945	54,717
October	—	17,091	91,998	60,152
<i>1919:</i>				
January	—	16,747	85,590	48,975
April	—	10,917	36,789	63,713
July	—	3,909	1,759	36,364
October	—	—	231	12,884
<i>1920:</i>				
January	—	—	84	5,531
April	—	—	67	1,500
July	—	—	67	—
October	—	—	69	—

A.I.F. CASUALTIES

Except for the few discharged or deserting abroad the 330,714 members of the A.I.F. who embarked were either killed or died on service, or were repatriated. For casualties see Tables 25, 26, 27, 34, and 60.

A gross figure for the number of deaths due to the war cannot be given. The term "Died of Wounds" is differently defined

by the several belligerents and by various writers. For the present purpose, though some soldiers of the First A.I.F. are still "dying of wounds" received in the war, the term denotes only men who *died before their discharge from the A.I.F.* The total number of deaths while serving with the A.I.F. was 60,255, and with the A.N. and M.E.F. 29, a final total of 60,284; 939 of these soldiers died before having gone overseas and 492 others died in Australia after return. Deducting these 1,431 the number of Australian soldiers who died on service overseas was 58,853. The ratio of deaths to embarkations was approximately 1 death to 5 embarked.

At "roll call" after each major operation many were absent, and failing evidence as to their whereabouts they were posted "missing" and were so "returned" on Army **Missing** Form *B. 213* (Field Return). The tracing of these men was a duty of Third Echelon—and an important and difficult one. The majority were identified as killed.⁴⁷ Figures for "missing" of the armies of Great Britain and most other powers are robbed of much of their comparative value by reason of the fact that (differently from those of the A.I.F.) they are made permanent, and include reported prisoners of war—often a very large number.

It is to be noted that the numbers given for "wounded" and "sick" represent the number of *woundings* or of "sickness" and injury, not of wounded, sick or injured men. It **Wounded** was common for men to be wounded or sick on several occasions.

⁴⁷ In this investigation the Australian Red Cross Society's hospital visitors were of the utmost assistance. A list of "missing" giving the man's name and unit was part of the technical equipment, as we may term it of their humane labours, and was a source of interest to the wounded, from whom information as to the fate of their "cobbers" was very often available. Many were traced as prisoners of war.

It will be noted that *Table 26* shows no "missing". This does not justify the assumption that all missing had been traced—as a matter of fact at the end of the war some 750 "missing" could not be traced in this way, nor by their units' "Courts of Enquiry" (held after the lapse of six months). During the period of Repatriation of the A.I.F. the search was intensified and when in 1921 the A.I.F. was finally demobilised a fate had been assigned after exact enquiry to every member of the force including 902 "illegal absentees".

In the American Army "the number of men reported as missing has been steadily reduced from a total of 22,784, exclusive of prisoners, to the figure 2,913". (From *The War with Germany*, a statistical summary by Col. Leonard P. Ayres, second edition with data revised to 1st August, 1919, p. 122).

TABLE No. 25

CASUALTIES OF A.I.F. AND BRITISH FORCES
(Including Dominions)

Proportion of Various Categories of Casualty

	A.I.F. serving with			Total A.I.F.	Total British and Dominion
	M.E.F.	E.E.F.	B.E.F.		
1. Total Battle Casualties ..	27,329	4,450	181,221	213,000	2,942,967
Total Non-Battle Casualties	64,569	38,950	219,382	322,901	6,187,725
Proportions ..	1:2.36	1:8.75	1:1.21	1:1.52	1:2.10
2. Total Killed ..	5,833	636	33,407	39,876	418,361
Total Wounded (Including D.O.W.) ..	21,426	3,688	143,643	168,757	2,172,148
Proportions ..	1:3.67	1:5.79	1:4.29	1:4.23	1:5.19
3. Total K., M., P. of W., and D.O.W. ..	7,888	1,099	48,881	57,868	937,991
Total Wounded (Less D.O.W.)	19,441	3,351	132,340	155,132	2,004,976
Proportions ..	1:2.46	1:3.05	1:2.70	1:2.68	1:2.14
4. Total died of Disease or Injury	600	590	1,942	3,132	113,173
Total Sick or Injured ..	63,069	38,360	217,440	319,769	6,074,552
Proportions ..	1:106.61	1:65.02	1:111.98	1:102.10	1:54.67
5. Total K., M., P. of W., D.O.W., Disease or Injury	8,488	1,689	50,823	61,000	1,051,164
Total Wounded, Sick, Injured less D.O.W., D.O.D. or D.O. Injuries ..	83,410	41,711	349,383	474,504	8,079,528
Proportions ..	1:9.82	1:24.69	1:6.87	1:7.78	1:7.69

TABLE No. 26

TOTAL BATTLE CASUALTIES IN THE AUSTRALIAN IMPERIAL FORCE DURING THE WAR

Theatre	Year	Killed	Died of Wounds	Died of Gas Poisoning	Total	Wounded in Action	Gassed	Shell Shock Wound	Prisoners of War	Total	Grand Total	Percentage of Deaths to Battle Casualties
France and Flanders	Apr.-Dec. 1916	9,048	2,575	18	12,541	27,891	230	613	995	27,729	42,270	29·6
	1917	15,162	4,790	84	20,036	49,148	4,462	895	2,295	56,800	76,836	26·2
	1918-19	8,297	3,671	221	12,189	37,181 ¹	11,804	116	558	49,659	61,848	19·7
Prisoners of War—Germany 1916-19		—	267	—	267	—	—	—	—	—	267	—
<i>Total for France:</i>		33,407	11,303	323	45,033	114,220	16,496	1,624	3,848	136,188	181,221	24·8
Dardanelles	1915	5,833	1,985	—	7,818	19,441	—	—	70	19,511	27,329	28·6
Egypt and Palestine	1916-18	636	337	—	973	3,351	—	—	126	3,477	4,450	21·8
Prisoners of War—Turkey ..	1915-19	—	21	—	21	—	—	—	—	—	21	—
United Kingdom	1915-19	3	1	—	4	1	—	—	—	1	5	—
Mesopotamia ¹¹	1915-19	1	—	—	1	—	—	—	—	—	1	—
Australia (Prior to 1921) ..		—	34	—	34	—	—	—	—	—	34	—
<i>Totals:</i>		39,880	13,681	323	53,884	137,013	16,496	1,624	4,044	159,177	213,061	25·3

¹ Includes 1,491 wounded and remained at duty in 1918.¹¹ No exact statistics are available for the Australians (some 600-800) who served in Mesopotamia.

TOTAL NON-BATTLE CASUALTIES IN THE AUSTRALIAN IMPERIAL FORCE DURING THE WAR

Theatre	Year	Died of Disease	Died of Other Causes (Accidents, etc.)	Total Deaths ¹	Sickness	Accidental Injuries, etc. ¹¹	Self-Inflicted Injuries	Total	Grand Total
France and Flanders ..	Apr.-Dec. 1916	231	68	299	46,066	289	126	46,481	46,780
	1917	268	131	399	89,071	753	186	90,010	90,409
	1918	540	164	704	71,824	2,588	388	74,800	75,504
	Jan.-Mar. 1919	434	36	470	6,092	56	1	6,149	6,619
Germany (P. of War) 1916-19		67	3	70	—	—	—	—	70
<i>Total for France:</i>									
Dardanelles ..		1,540	402	1,942	213,053	3,686	701	217,440	219,382
Egypt and Palestine ..	1915	569	31	600	63,969	—	—	63,969	64,569
Turkey (P. of War) ..	1916-18	454	136	590	38,360	—	—	38,360	38,950
Mesopotamia ..	1916-19	39	—	39	—	—	—	—	39
United Kingdom ..	1915-19	15	—	15	—	—	—	—	15
At Sea ¹¹ ..	1914-19	1,072	177	1,249	77,773	—	—	77,773	79,022
Australia (Recruits) ..	1914-19	355	57	412	—	—	—	—	412
Australia (Invalids) ..	1914-18	808	131	939	33,906 ¹⁴	—	—	33,906	34,845
Other Places ..	1914-19	423	69	492	—	—	—	—	492
		88	5	93	—	—	—	—	93
<i>Totals:</i>		5,363	1,008	6,371	427,061	3,686	701	431,448	437,819

¹ Deaths from sickness in the A.N. and M.E.F. which numbered 29 are not included in the above totals.

¹¹ The discrepancy between the figure for "accidental injuries" and that given in *Volume II, p. 496* is due to the fact that only those men are included who were officially reported on *A.F.W. 3428* (report on accidental and self-inflicted injuries). Many other small injuries due to accident, e.g. sprains, etc., were reported as "sick". The figures given in *Volume II, pp. 864-5* include slight amendments of some of those given in this table. For the Dardanelles and Palestine Campaigns accidental and self-inflicted injuries are included under "Wounded" (*Table 26*).

¹¹¹ No comprehensive statistics exist for sickness on transports.

¹⁴ Discharged medically unfit. See *Table No. 12, p. 882*.

TABLE No. 28

AGES OF A.I.F. AND A.N. AND M.E.F. AT ENLISTMENT, DISCHARGE, AND DEATH

Age	Enlistments ¹		Embarkations for Service Overseas ¹		Discharged as Medically Unfit		Deaths from Disease	
	Number of each age at enlistment	Percentage at each age	Number of each age at enlistment	Percentage at each age	Number of each age at discharge	Percentage at each age	Number of each age at death	Percentage at each age
18	28,100	6.74	24,300	7.08	3,400	5.11	69	1.35
19	30,500	7.32	26,400	7.69	3,950	5.93	217	4.26
20	32,900	7.89	28,500	8.30	4,500	6.75	294	5.76
21	35,300	8.47	30,600	8.92	5,100	7.66	341	6.69
22	32,100	7.71	26,700	7.78	4,550	6.83	395	7.74
23	29,300	7.02	23,100	6.73	4,150	6.23	393	7.71
24	26,600	6.38	20,700	6.03	3,750	5.63	335	6.57
25	24,000	5.77	18,300	5.33	3,450	5.18	344	6.74
26	21,800	5.23	16,200	4.72	3,150	4.73	309	6.06
27	19,500	4.69	14,600	4.25	2,900	4.35	265	5.20
28	17,400	4.17	13,200	3.85	2,650	3.98	270	5.29
29	15,500	3.72	12,000	3.50	2,400	3.60	211	4.14
30	13,800	3.30	10,800	3.15	2,200	3.30	196	3.84
31	12,100	2.90	9,750	2.84	2,050	3.08	170	3.33

32	10,600	2.54	8,850	2.58	1,900	2.85	142	2.78
33	9,200	2.21	8,000	2.33	1,750	2.63	161	3.16
34	7,900	1.90	7,300	2.13	1,650	2.48	136	2.67
35	6,900	1.66	6,600	1.92	1,550	2.33	118	2.31
36	6,000	1.45	5,950	1.73	1,450	2.18	108	2.12
37	5,300	1.27	5,300	1.54	1,375	2.06	95	1.86
38	4,700	1.12	4,700	1.37	1,300	1.95	89	1.74
39	4,100	0.99	4,100	1.20	1,230	1.85	65	1.27
40	3,800	0.91	3,700	1.08	1,175	1.76	87	1.71
41	3,800	0.91	3,300	0.96	1,115	1.67	59	1.16
42	3,800	0.91	3,000	0.87	1,100	1.65	53	1.04
43	3,800	0.91	3,000	0.87	1,150	1.73	44	0.86
44	4,000	0.95	3,300	0.96	1,210	1.82	64	1.25
45	4,000	0.96	1,000	0.29	450	0.68	71	1.39
Total	416,809	100.00	343,250	100.00	66,605	100.00	5,101	100.00
Average age 26.4 years		26.4 years at enlistment			27.5 years		28.1 years	

Estimated average age for all males in Australia in the year 1916—28.1 years.

¹ Number at each age estimated on the basis of the numbers in each age group at enlistment, *vide* Defence Statistics.

¹¹ Number at each age estimated from particulars tabulated from selected Embarkation Rolls for the year 1914 and for each half of the years 1915, 1916, 1917 and 1918.

Table prepared by *Commonwealth Statistician*. The figures are incomplete, in particular those given under the heading "discharged medically unfit," are greatly below the full total (*See p. 883*). They show accurately, however, the proportionate age grouping.

DEATHS IN THE A.I.F., 1914-21

The figures given in the several tables under this heading will be found to vary slightly. This is due to the fact that they derive from different sources.

TABLE No. 29

DEATHS IN THE A.I.F. ABROAD—BY YEARS

Year	From Battle Casualties	From Non-Battle Casualties	Total	Progressive Total
1914	—	14	14	14
1915	7,819	655	8,474	8,488
1916	12,823	873	13,696	22,184
1917	20,628	1,108	21,736	43,920
1918	12,553	1,687	14,240	58,160
1919	27	597	624	58,784
1920	—	6	6	58,790
Totals ..	53,850	4,940	58,790	58,790

TABLE No. 30

A.I.F.—DEATHS FROM BATTLE CASUALTIES IN EACH THEATRE OF WAR

Theatre	1915	1916	1917	1918	1919	Total
Gallipoli (Including Deaths in Other Places) .. .	7,818	—	—	—	—	7,818
Egypt and Palestine (Including Deaths in Other Places) ..	—	166	506	309	6	987
France (Including Deaths in Other Places) .. .	—	12,657	20,122	12,244	21	45,044
Mesopotamia .. .	1	—	—	—	—	1
Totals .. .	7,819	12,823	20,628	12,553	27	53,850

TABLE No. 31

LOCALITIES AND YEARS IN WHICH DEATHS FROM OTHER CAUSES THAN WOUNDS OCCURRED

(During the whole life of the A.I.F. Aug. 1914-April, 1921)

Theatre	1914	1915	1916	1917	1918	1919	1920	1921	Total
Recruits in Australia ..	26	446	383	58	26	—	—	—	939
A.N. and M.E.F. ..	2	9	2	2	7	4	1	1	28
At Sea ..	6	101	108	72	76	48	1	—	412
Galipoli (including M.E.F.) ..	—	291	—	—	—	—	—	—	291 ¹
United Kingdom ..	—	22	178	493	522	252	3	—	1,470 ¹¹
B.E.F. (France and Belgium) ..	—	—	271	424	701	250	—	—	1,646 ¹¹
Egypt (including E.E.F.) ..	8	238	253	33	116	49	1	—	698 ¹
Mesopotamia ..	—	—	4	5	6	—	—	—	15
Palestine ..	—	—	—	16	174	11	—	—	201 ¹
Colombo ..	—	2	2	1	—	3	—	—	8
Africa ..	—	—	27	17	29	4	1	—	78
India ..	—	—	3	—	1	—	—	—	4
Germany (Prisoners of War) ..	—	—	5	17	45	3	—	—	70
Turkey (Prisoners of War) ..	—	1	12	18	6	2	—	—	39
America ..	—	—	—	2	1	—	—	—	3
After return to Australia ..	—	20	65	66	115	159	47	9	481 ¹¹
	42	1,130	1,313	1,224	1,825	785	54	10	6,383 ¹¹

¹ The figures for the total "non-battle" deaths in the Eastern Theatre of War (1,190) coincide with those given in Tables 27 and 60, but are allotted under different administrations.

¹¹ The discrepancy between the figures given in this table under the headings "U.K." and "B.E.F." and those in Table 27 and on p. 894 is due to discrepancies in the records which cannot be adjusted. The figure 481 includes sickness caused through wounding

The following table of deaths from other than battle casualties by months shows among other things the higher mortality not only in Britain and France but in Egypt during the colder half of the year.

TABLE No. 32

MONTHS IN WHICH THE ABOVE DEATHS BY ILLNESS, ACCIDENTS, ETC. OCCURRED IN
DIFFERENT THEATRES

	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Recruits	47	47	40	48	77	91	86	161	116	95	73	58	939
A.N. and M.E.F. ..	4	2	3	3	3	2	3	2	1	2	—	3	28
At Sea	38	24	13	24	31	37	40	41	26	53	49	36	412
Gallipoli	—	—	—	—	—	—	—	—	—	—	—	—	—
M.E.F. (including ..	—	—	—	1	19	12	35	38	54	55	48	29	291
United Kingdom ..	157	245	135	102	65	71	71	74	66	184	174	126	1,470
B.E.F. (France and ..	—	—	—	—	—	—	—	—	—	—	—	—	—
Belgium)	121	246	124	117	74	95	78	70	66	173	275	207	1,646
Egypt (including ..	—	—	—	—	—	—	—	—	—	—	—	—	—
E.E.F.)	82	93	80	64	53	57	35	41	24	63	49	57	698
Palestine	7	—	2	5	7	5	3	12	6	112	38	4	201
Mesopotamia	1	—	—	1	1	1	2	3	1	2	1	2	15
Colombo	—	3	—	2	3	—	—	—	—	—	—	—	8
Africa	7	1	2	—	3	4	6	6	6	24	8	11	78
India	—	—	—	—	—	—	—	2	—	1	1	—	4
Germany (Prisoners ..	—	—	—	—	—	—	—	—	—	—	—	—	—
of War)	4	2	—	—	2	2	4	9	6	24	12	5	70
Turkey (Prisoners of ..	—	—	—	—	—	—	—	—	—	—	—	—	—
War)	3	7	2	5	1	2	1	3	1	3	9	2	39
America	—	—	—	—	—	1	—	—	1	—	1	—	3
After return to Aus- ..	—	—	—	—	—	—	—	—	—	—	—	—	—
tralia ¹	42	30	42	44	32	42	33	40	34	32	47	63	481
	513	700	443	416	371	422	397	502	408	823	785	603	6,383

¹ Before discharge from the Army. The A.I.F. was demobilised and every soldier discharged by 1st April 1941.

STATISTICS OF INVALIDS

TABLE No. 33

A.I.F. IN HOSPITAL IN UNITED KINGDOM 1917-19
INCLUDING INVALIDS AWAITING RETURN TO
AUSTRALIA

Date	In British Hospitals (excluding Tidworth, Farnborough, Codford, Sutton Veny, i.e. A.I.F. Depot Hospitals)	In Australian Auxiliary Hospitals	Total	Awaiting return to Australia (Reviewed by Consultants)	Grand Total
<i>1917</i>					
3rd Quarter	6,095	2,290	8,394	4,881	13,275
4th Quarter	9,802	2,603	12,405	5,317	17,622
<i>1918</i>					
1st Quarter	3,927	2,015	5,942	4,717	10,659
2nd Quarter	6,229	2,623	8,852	3,536	12,388
3rd Quarter	6,713	2,645	9,358	3,855	13,213
4th Quarter	6,504	3,374	9,878	4,214	14,092
<i>1919</i>					
1st Quarter	1,451	2,198	3,649	6,134	9,783
2nd Quarter	312	1,028	1,340	952	2,292

TABLE No. 34

MEMBERS OF THE A.I.F. RETURNED TO AUSTRALIA—
1914-1922

Date	Sick	Wounded	Over age	Under age	Others	Total
4th Quarter	6	—	—	—	—	6
<i>1914</i>	6	—	—	—	—	6
1st Quarter	162	—	—	—	164	326
2nd Quarter	393	—	—	—	457	850
3rd Quarter	1,337	987	—	—	1,129	3,453
4th Quarter	1,863	1,442	—	—	518	3,823
<i>1915</i>	3,755	2,429	—	—	1,354	8,452
1st Quarter	3,123	776	—	2	546	4,447
2nd Quarter	2,296	1,033	4	2	954	4,289
3rd Quarter	3,082	558	20	—	555	4,215
4th Quarter	1,358	1,083	23	3	483	2,950
<i>1916</i>	9,859	3,450	47	7	2,445	15,901

TABLE NO. 34—(Continued)

Date	Sick	Wounded	Over age	Under age	Others	Total
1st Quarter	495	336	2	3	185	1,021
2nd Quarter	2,566	1,616	116	6	343	4,647
3rd Quarter	5,496	3,018	473	29	641	9,687
4th Quarter	7,328	2,624	292	2	476	10,822
1917	15,885	7,594	883	40	1,645	26,047
1st Quarter	5,791	3,701	280	126	476	10,374
2nd Quarter	5,428	3,508	53	38	661	9,688
3rd Quarter	4,036	2,138	38	82	583	6,877
4th Quarter	4,784	1,762	30	50	8,855	15,481
1918	20,039	11,109	401	296	10,575	42,420
1st Quarter	11,049	6,793	18	18	14,542	32,420
2nd Quarter	9,363	—	—	—	42,594	51,957
3rd Quarter	436	—	—	—	57,866	58,302
4th Quarter	551	—	—	—	18,149	18,700
1919	21,399	6,793	18	18	133,151	161,379
1st Quarter	105	—	—	—	7,635	7,740
2nd Quarter	—	—	—	—	1,749	1,749
3rd Quarter	—	—	—	—	430	430
4th Quarter	—	—	—	—	135	135
1920	105	—	—	—	9,949	10,054
1st Quarter	—	—	—	—	31	31
2nd Quarter	—	—	—	—	13	13
3rd Quarter	—	—	—	—	26	26
4th Quarter	—	—	—	—	13	13
1921	—	—	—	—	83	83
1st Quarter	—	—	—	—	9	9
2nd Quarter	—	—	—	—	5	5
3rd Quarter	—	—	—	—	15	15
4th Quarter	—	—	—	—	2	2
1922	—	—	—	—	31	31
Total ..	71,048	31,375	1,349	361	160,240	264,373
Percentage	26.87	11.86	0.51	0.14	60.62	100.00

The above figures include 41 medical students who were officially returned to Australia for "completion of medical studies". This excellent arrangement—taken in the A.I.F. so far as can be ascertained before any other belligerent—was the outcome of action taken by the Medical Schools of Melbourne, Sydney and Adelaide at the request of the Defence Department to expedite the graduation of advanced medical students. This was followed (in a logical sequence) by Ministerial sanc-

tion on 3rd July, 1915, to a request by the D.G.M.S. that provision should be made for the return of 3rd and 4th year medical students; who should be permitted to complete their studies. The Ministerial sanction provided that they should not be discharged from the A.I.F. but given leave without pay; on qualification they would return to service, and should apply for commissions as medical officers. General Howse also arranged that medical students serving in the ranks of the A.A.M.C. might return to Australia on transport duty in order to complete their studies on arrival.

IV

WASTAGE IN THE A.I.F. ON THE WESTERN FRONT AND THE PART OF THE MEDICAL SERVICE IN THE MAINTENANCE OF NUMBERS

The statistical tables in this Part relate to the medical aspect of the problem of maintaining at the highest possible level the effective strength of the Australian Imperial Force on the Western Front.⁴⁸

The following note explains the authorities for these tables and also certain discrepancies between them and others.

The chief authority so far as troops in France are concerned is the Australian Records Section of 3rd Echelon, G.H.Q., B.E.F. From Unit "Part II Orders", it compiled monthly "Statistical Summaries" of casualties and replenishments. From these it has been possible to ascertain in which units, and on which days, every casualty was sustained; and thus, by reference to the "Part II Orders" of the various Units, to identify, if necessary, the individuals included in any table. It is with exceptional assurance of accuracy, therefore, that the figures relating to experience in France and Belgium are presented.

The figures relating to the A.I.F. in Great Britain are from statements compiled in the Records Section of the Australian Administrative Headquarters, London, supplemented by records kept at the Headquarters of the A.I.F. Depots in U.K. In respect to the latter the figures for 1916 and 1917 are incomplete but where necessary it has been found possible to fill the gaps from other records and by deduction.

Deficiencies. Certain deficiencies in the figures here given must be noted. They do not cover all categories of arrivals and departures to and from France and the United Kingdom. Thus they do not include a large number of men in transit on leave, or for training, or other forms of duty—in the course of which they might again become casualties. Only those figures which are relevant to the subject—the part of the medical service in maintaining numbers—are included.

Thus, turning to Table No. 38 the strength of the A.I.F. in France at the end of 1918 should on these figures be 106,431, whereas actually

⁴⁸ The figures relating to the material of *Vol. I* are given in that volume.

it was 90,688 (a shortage of 15,743). On the other hand in Table 52 the strength of the A.I.F. in U.K. at the end of 1918 should, on the data here presented, have been 32,397; it was, in fact, 43,896—an excess of 11,499. The discrepancy in each case is accounted for by the *movement of troops other than as casualties or reinforcements*. The difference between the excess of departures from France as shown in Table 38 (15,743) and the excess of arrivals in U.K. as shown in Table 52 (11,499) i.e. 4,244, is to be accounted for chiefly by *direct transfers* to Egypt and Australia, for reasons other than those covered.

British figures. The figures quoted (by permission of the War Office) from the *British Official History* are selected from a large number of exceedingly useful tables given in the Statistical Volume of the *British Official Medical History of the War*.

The term “wastage”.⁴⁹ A force in the field may waste away from two chief causes—enemy action (battle casualties) and the wear and tear of health under the conditions of a military campaign (non-battle casualties). “Wastage” may be either temporary and local, involving only the field units or prolonged or permanent, and involving the whole expeditionary force. This Part concerns mainly, but not wholly, the problem of “expeditionary wastage”—i.e. wastage that involved evacuation across the English Channel.⁵⁰

THE STRENGTH OF THE A.I.F. ON THE WESTERN FRONT

The main basis of the medical statistics of a war is the strength of the force engaged, since this represents the basic figure for the numbers “exposed to risk”. The two small tables given below as a background present (a) the strength of the B.E.F. in France and Flanders and (b) the strength of the A.I.F. there. The authority for the latter is the records of the Finance Department of the A.I.F.; the figures represent the numbers certified as correct for the adjustment of the per capita payments to the British Government. They include all Australian troops in France and Belgium, and therefore hospitals and other L. of C. units. (Nearly all the Australians covered were, however, front line troops.)

⁴⁹ The term is used diversely to signify (a) gross wastage—the numerical losses sustained by a force in the field or (b) net wastage—the excess of losses over replenishments (whether by new reinforcements or by “return to duty”). In this work it indicates gross wastage unless otherwise stated.

⁵⁰ The *clinical analysis* of causes of wastage from non-battle casualties at the several levels of evacuation at the seat of war—Field Ambulance (division), Casualty Clearing Station (Army), Base Hospital (force in the field) and Hospitals in U.K.—are given in Part V.

TABLE No. 35

**APPROXIMATE AVERAGE RATION STRENGTH OF THE
BRITISH EXPEDITIONARY FORCE ON THE WESTERN
FRONT IN FRANCE AND FLANDERS**

Campaign	Year	British and Dominion Troops	Indian, African or Other	Followers or Labour	Grand Total
France and Flanders, 4/8/14- 11/11/18	1914	190,000	24,572	6,000	220,572
	1915	616,086	35,568	10,688	662,342
	1916	1,322,075	12,299	2,681	1,337,055
	1917	1,894,511	11,463	62,905	1,968,879
	1918	1,857,026	14,500	117,848	1,989,374

From British Official Medical History—Statistics, pp. 2-3.

TABLE No. 36

**MAINTENANCE OF A.I.F. ON THE WESTERN FRONT
(IN FRANCE AND FLANDERS)**

At start of each Quarter	1915	1916	1917	1918
1st Quarter	—	657	115,378	115,966
2nd Quarter	—	35,123	120,668	124,337
3rd Quarter	—	74,846	120,870	116,350
4th Quarter	657	87,643	121,135	95,711

TABLE No. 37

**MAINTENANCE OF A.I.F. ON THE WESTERN FRONT
ARRIVALS**

Year	Strength at Beginning of Each Year	From Australia	From Egypt	From U.K.		Total Arrivals
				New Reinforcements	Recovered Sick and Wounded	
1915 ..		657				657
1916 ..	657	—	96,503	51,238	10,338	158,079
1917 ..	115,378	—	—	66,961	25,455	92,416
1918 ..	115,966	—	—	34,097	20,994	55,091
		657	96,503	152,296	56,787	306,243

TABLE No. 37—(Continued)

DEPARTURES

Year	Battle Deaths	Non-Battle Deaths	Prisoners of War	Sick and Wounded Embarked for U.K.	Total Losses	Yearly Increase or Loss
1916 ..	12,541	299	995	33,340	47,175	110,904 increase
1917 ..	20,036	399	2,295	64,280	87,010	5,406 increase
1918 ..	12,187	704	558	52,178	65,627	10,536 loss ¹
	44,764	1,402	3,848	149,798	199,812	

RELATIVE IMPORTANCE OF THE CAUSES OF WASTAGE¹¹

Year	Battle Deaths ¹¹¹	Non-Battle Deaths	Prisoners of War	Sick and Wounded Embarked for U.K.	Total
1916 ..	26.59	0.63	2.11	70.67	100.00
1917 ..	23.04	0.46	2.64	73.86	100.00
1918 ..	18.58	1.07	0.85	79.50	100.00
1916-18 .	22.40	0.70	1.93	74.97	100.00

¹ The strength of the A.I.F. in France at the end of 1918 was 90,688.

¹¹ "Wastage" signifies subtraction from the B.E.F. The figures do not agree exactly with those given in Table 51, the reason being that here the "arrivals" are for reinforcements and recovered convalescents from U.K. who arrived in France, many of whom after the Armistice did not rejoin their units. Those in Table 51 (q.v.) on the other hand include only men who actually joined their units in the field.

¹¹¹ Including "Died of Wounds" in France and Flanders.

Between March 1916 and the end of 1918, 306,243 members of the Australian Imperial Force took the field in France and Belgium. During this period the "expeditionary wastage"⁵¹ from all causes was 199,812.

Average stay in B.E.F.

The *average strength* of the A.I.F. on the Western Front was approximately 100,000. The total Aus-

⁵¹ At the end of the war each of the battalions of the 1st Division, A.I.F. had over 7,000 names on their nominal rolls. This total included, besides the original unit of 1,020 men, all new reinforcements and all transfers from other units. The battalions were seldom "at strength" and in 1918 the establishment itself was much reduced. A considerable proportion—probably some 20 per cent.—of this 7,000 were not actually "taken on strength"; some were diverted to other units, some were found on arrival overseas to be "unfit" and were returned to Australia "without service". From March, 1918, onwards all reinforcements from Australia were "general" and were distributed to units from the Depots in U.K. as required. Broadly over a period of five years the units required approximately 100 per cent. of reinforcements annually. The rate was much greater in the first stages of the war; when once a "pool" or "reserve" of recovered convalescents was available, the requirement in new reinforcements was correspondingly lessened. See Vol. I, p. 369n.

TABLE No. 38

ARRIVALS OF A.I.F. ON THE WESTERN FRONT COMPARED WITH CASUALTIES

(Quarterly Figures and Totals)

	Strength Before 1916	Arrivals from Egypt	New Re-inforcements from U.K.	Recovered from U.K.	Total Arrivals	Battle Deaths	Non-Battle Deaths	Prisoners of War	Sick and Wounded to U.K.	Wastage
1st Quarter	657	33,800	738	—	34,538	6	—	—	20	26
2nd Quarter		38,703	3,500	500	48,703	592	75	24	2,680	3,371
3rd Quarter		24,000	14,000	4,434	42,434	9,403	71	898	18,500	28,872
4th Quarter		—	33,000	5,404	38,404	2,540	153	73	12,140	14,906
Year 1916 ..		96,503	51,238	10,338	158,079	12,541	299	995	33,340	47,175
1st Quarter		—	16,500	6,896	23,396	2,420	188	177	13,839	16,624
2nd Quarter		—	20,000	6,660	26,660	6,669	91	1,912	16,894	25,566
3rd Quarter		—	12,983	5,239	18,222	4,492	47	85	12,647	17,271
4th Quarter		—	17,478	6,660	24,138	6,455	73	121	20,900	27,549
Year 1917 ..		—	66,961	25,455	92,416	20,036	399	2,295	64,280	87,010
1st Quarter		—	10,550	6,439	16,989	1,070	79	49	8,468	9,666
2nd Quarter		—	11,511	5,621	17,132	4,700	90	410	17,625	22,825
3rd Quarter		—	6,209	5,183	11,392	5,739	102	92	20,600	26,533
4th Quarter		—	5,737	3,751	9,488	678	433	7	5,485	6,063
Year 1918 ..		—	34,097	20,994	55,091	12,187	704	558	52,178	65,627
Total ..	657	96,503	152,296	56,787	305,586	44,764	1,402	3,848	149,798	199,812

Note: It must be borne in mind that there were other reasons besides casualties for subtraction of men from the front—e.g. leave, or transfer to schools, training, etc. This table takes no account of these.

tralian "wastage" from the B.E.F. during that time was 199,812, and total new arrivals 306,243. The average time spent in the B.E.F. by each soldier was $11\frac{1}{2}$ months—343 days. Briefly, the calculation was made on the basis of 105,289,248 "personnel days" over a period of 33 months. In the calculation of personnel days, recovered casualties from U.K. are included but nurses are excluded.⁵²

GENERAL CAUSES OF CASUALTIES IN THE A.I.F. ON THE
WESTERN FRONT

In the following tables the figures are based on *local* evacuation and represent the numbers admitted to Field Ambulances, and not evacuation from France (though the figure for the latter is, of course, included in that for the former).

TABLE No. 39

B.E.F. AND AUSTRALIAN CASUALTIES ON THE
WESTERN FRONT

	B.E.F.		A.I.F.	
	Number	Percentage of total A. and B.	Number	Percentage of total A. and B.
A. <i>Battle Casualties</i>				
Battle Deaths (Including Killed, Died of Wounds, Missing)	677,515	11·21	44,764	11·67
Wounded Evacuated (Excluding Died)	1,837,613	30·41	130,849	34·11
B. <i>Non-Battle Casualties</i>				
Non-Battle Deaths. (Disease or Injury)	32,098	0·53	1,402	0·36
Sick or Injured (Excluding Died)	3,496,388	57·85	206,576	53·86
Total—A. and B.	6,043,614	100·00	383,591	100·00
Prisoners of War	174,926		3,848	
Totals	6,218,540		387,439	

Note: The British casualties here given are for the whole war, the Australian from 1916 onwards. The British prisoner casualties represent 2·81 of the total figure for casualties, the Australian 0·99 per cent.

Authority: British figures from p. 108, Table 2, *British Official Medical History*; A.I.F. chiefly from A.I.F. and Australian Base Records Sections.

⁵² For these calculations the writer is indebted to Prof. A. D. Gilchrist, Royal Military College of Australia.

TABLE No. 40

SUMMARY OF CAUSES OF BATTLE AND NON-BATTLE CASUALTIES IN THE A.I.F. ON THE
WESTERN FRONT, 1916-1918
(Quarterly Figures and Totals)

	Battle Deaths	Prisoners of War	Wounded Evacuated (Excluding Died)	Total Battle Casualties	Non-Battle Deaths	Sick and Injured (Excluding Died)	Total Non-Battle Casualties	Total Battle and Non-Battle Casualties
1st Quarter ..	6		16	22		40	40	64
2nd Quarter ..	592	24	1,768	2,384	75	5,460	5,535	7,919
3rd Quarter ..	9,403	898	21,961	32,262	71	10,735	10,806	43,068
4th Quarter ..	2,540	73	4,989	7,602	153	29,123	29,276	36,878
Year 1916 ..	12,541	995	28,734	42,270	299	45,358	45,657	87,927
1st Quarter ..	2,420	177	5,982	8,579	188	28,132	28,320	36,899
2nd Quarter ..	6,669	1,912	17,914	26,495	91	20,352	20,443	46,938
3rd Quarter ..	4,492	85	13,583	18,160	47	19,220	19,267	37,427
4th Quarter ..	6,455	121	17,026	23,602	73	20,981	21,054	44,656
Year 1917 ..	20,036	2,295	54,505	76,836	399	88,685	89,084	165,920
1st Quarter ..	1,070	49	5,247	6,366	79	21,878	21,957	28,323
2nd Quarter ..	4,700	410	17,344	22,454	90	21,572	21,662	44,116
3rd Quarter ..	5,739	92	22,574	28,405	102	16,755	16,857	45,262
4th Quarter ..	678	7	2,445	3,130	433	12,238	12,761	15,891
Year 1918 ..	12,187	558	47,610	60,355	704	72,533	73,237	133,592
Total	44,764	3,848	130,849	179,461	1,402	206,576	207,978	387,439

TABLE No. 41

GENERAL CAUSES OF A.I.F. BATTLE CASUALTIES, WESTERN FRONT, 1916-1918
(Quarterly Figures and Totals)

	Killed in Action	Died of Wounds	Died of Gas	Total Deaths	Wounded	Shell Shock (wounded)	Gassed	Prisoners of War	Total Gassed and Wounded, Etc.	Grand Total
1st Quarter	5	1		6	16				16	22
2nd Quarter	413	177	2	592	1,709	50	9	24	1,792	2,384
3rd Quarter	7,677	1,716	10	9,403	21,383	438	140	898	22,859	32,262
4th Quarter	1,853	681	6	2,540	4,783	125	81	73	5,062	7,602
Year 1916	9,948	2,575	18	12,541	27,891	613	230	995	29,729	42,270
1st Quarter	1,606	808	6	2,420	5,819	87	76	177	6,159	8,579
2nd Quarter	5,247	1,414	8	6,669	10,913	247	754	1,912	19,836	26,495
3rd Quarter	3,440	1,045	7	4,492	12,575	287	721	85	13,668	18,160
4th Quarter	4,869	1,523	63	6,455	13,841	274	2,911	121	17,147	23,602
Year 1917	15,162	4,790	84	20,036	49,148	895	4,462	2,295	56,800	76,836
1st Quarter	749	283	38	1,070	2,964	21	2,262	49	5,296	6,366
2nd Quarter	3,130	1,439	131	4,700	12,266	73	5,005	410	17,754	22,454
3rd Quarter	4,935	1,669	35	5,739	18,588	22	3,964	92	22,666	28,405
4th Quarter	383	278	17	678	1,872		573	7	2,452	3,130
Year 1918	8,297	3,669	221	12,187	35,690	116	11,804	558	48,168	60,355
Total ..	33,407	11,034	323	44,764	112,729	1,624	16,496	3,848	134,697	179,461

TABLE No. 42

GENERAL CAUSES OF A.I.F. NON-BATTLE CASUALTIES, WESTERN FRONT, 1916-1918
(Quarterly Figures and Totals)

	Died of Disease	Died Other Causes	Total Deaths	Sick	Accidentally Injured	Self-Inflicted Wounds	Total Sick and Injured	Total Non-Battle Casualties
1st Quarter ..				38	2		40	40
2nd Quarter ..	51	24	75	5,399	38	23	5,460	5,535
3rd Quarter ..	49	22	71	10,552	128	55	10,735	10,866
4th Quarter ..	131	22	153	28,954	121	48	29,123	29,276
Year 1916 ..	231	68	299	44,943	289	126	45,358	45,657
1st Quarter ..	152	36	188	29,665	227	40	28,132	28,320
2nd Quarter ..	53	38	91	20,010	290	52	20,352	20,443
3rd Quarter ..	26	21	47	19,020	150	41	19,220	19,267
4th Quarter ..	37	36	73	20,842	86	53	20,981	21,054
Year 1917 ..	268	131	399	87,746	753	186	88,685	89,084
1st Quarter ..	55	24	79	21,751	83	64	21,878	21,957
2nd Quarter ..	42	48	90	20,593	778	201	21,572	21,662
3rd Quarter ..	46	56	102	15,223	1,417	115	16,755	16,857
4th Quarter ..	397	36	433	12,010	310	8	12,328	12,761
Year 1918 ..	540	164	704	69,557	2,588	388	72,533	73,237
Total ..	1,039	363	1,402	202,246	3,630	700	206,576	207,978

DISPOSAL OF CASUALTIES IN "ARMY" AREA

Note on "Remained on Duty". The fact that in the British Army the R.M.O. kept no records, and that there was no system of "regimental" medical units (*i.e.* units responsible to and rendering returns to the "brigade") excluded from the British medical records some woundings and a large amount of *sickness* (*i.e.* it excluded all casualties that remained on duty or within brigade control). The figures in the next set of tables are based on the field returns (*B.213*) rendered weekly by all units, supported by the *A.36* rendered by field medical units. With the introduction in July 1916 of the "Wound Stripe", however, instructions were issued that men who "remained on duty" after wounding should be recorded (as well as men evacuated wounded) in the *B.213*. Thenceforth wounded men who remained on duty (but not the sick treated in the lines) were recorded among the casualties. Thus in Part II Orders they were shown as "Wounded in action—remained on duty".

Proportion of Wounded to Sick. For the total B.E.F. the proportion of wounded to sick and injured treated by the medical service was 1 to 1.8 all ranks⁵³ while for the A.I.F. it was 1 to 1.5.

TABLE No. 43

DISPOSAL OF A.I.F. BATTLE AND NON-BATTLE
CASUALTIES IN ARMY AREA, 1916-1918

	1916	1917	1918	Total
<i>Admitted to Field Medical Units</i>				
(a) Battle Casualties	31,327	59,379	51,500	142,206
(b) Non-Battle Casualties ..	45,657	89,084	73,237	207,978
Total Admitted to Field Medical Units in Army Area .. .	76,984	148,463	124,737	350,184
<i>Battle and Non-Battle Casualties</i>				
(a) Died in Field Medical Units	1,470	2,713	2,242	6,425
(b) Returned to Duty .. .	14,734	29,574	21,197	65,505
(c) Evacuated to Expeditionary Base .. .	60,780	116,176	101,298	278,254
Total .. .	76,984	148,463	124,737	350,184

⁵³ *British Official History, Statistics, p. 110.*

TABLE No. 44

DISPOSAL OF A.I.F. BATTLE CASUALTIES IN ARMY AREA,
WESTERN FRONT, 1916-1918

(Quarterly Figures and Totals)

	Admissions			Discharges		
	Wounded (Including Died of Wounds)	Gassed Admitted to Field Medical Units	Total	Died in Field Medical Units	Evacuated to Expedi- tionary Base	Return to Duty
1st Quarter	17	—	17	—	17	—
2nd Quarter	1,936	11	1,947	93	1,757	97
3rd Quarter	23,537	150	23,687	916	21,588	1,183
4th Quarter	5,589	87	5,676	364	5,029	283
Year 1916	31,079	248	31,327	1,373	28,391	1,563
Percentage of Total Battle Casualties 1916-18 ..	21·85	0·17	—	0·97	19·97	1·10
1st Quarter	6,714	82	6,796	430	6,028	338
2nd Quarter	18,574	762	19,336	754	17,616	966
3rd Quarter	13,907	728	14,635	556	13,349	730
4th Quarter	15,638	2,974	18,612	840	16,843	929
Year 1917	54,833	4,546	59,379	2,580	53,836	2,963
Percentage of Total Battle Casualties 1916-18 ..	38·56	3·19	—	1·81	37·86	2·08
1st Quarter	3,268	2,300	5,568	170	5,120	278
2nd Quarter	13,778	5,136	18,914	816	17,843	255
3rd Quarter	20,279	3,999	24,278	882	23,197	199
4th Quarter	2,150	590	2,740	139	2,573	28
Year 1918	39,475	12,025	51,500	2,007	48,733	760
Percentage of Total Battle Casualties 1916-18 ..	27·76	8·46	—	1·41	34·27	0·53
Total ..	125,387	16,819	142,206	5,960	130,960	5,286
Ratio per 1,000 of A.I.F. in France 1916-18 ..	410·32	55·03	465·35	19·50	428·55	17·30

TABLE No. 45

DISPOSAL OF A.I.F. NON-BATTLE CASUALTIES IN ARMY
AREAS, WESTERN FRONT, 1916-1918

(Quarterly Figures and Totals)

	Admissions			Discharges		
	Sick (In- cluding Died of Disease)	Injured and Self Inflicted Wound (Including Died from Other Causes)	Total	Died in Field Medical Units	Evacuated to Expedi- tionary Base	Return to Duty
1st Quarter	38	—	40	—	29	11
2nd Quarter	5,450	85	5,535	24	3,921	1,590
3rd Quarter	10,601	205	10,806	23	7,606	3,087
4th Quarter	29,085	191	29,276	50	20,743	8,483
Year 1916	45,174	483	45,657	97	32,389	13,171
Percentage of Total Non- Battle Casualties 1916-18 ..	21·73	0·23	—	0·05	15·57	6·33
1st Quarter	28,017	303	28,320	62	19,153	9,105
2nd Quarter	20,063	380	20,443	31	14,562	5,850
3rd Quarter	19,055	212	19,267	16	13,693	5,558
4th Quarter	20,879	175	21,054	24	14,932	6,098
Year 1917	88,014	1,070	89,084	133	62,340	26,611
Percentage of Total Non- Battle Casualties 1916-18 ..	42·32	0·51	—	0·06	29·98	12·80
1st Quarter	21,786	171	21,957	26	15,578	6,353
2nd Quarter	20,635	1,027	21,662	30	15,615	6,017
3rd Quarter	15,269	1,588	16,857	34	12,371	4,452
4th Quarter	12,407	354	12,761	145	9,001	3,615
Year 1918	70,097	3,140	73,237	235	52,565	20,437
Percentage of Total Non- Battle Casualties 1916-18 ..	33·70	1·51	—	0·11	25·27	9·83
Total ..	203,285	4,693	207,978	465	147,294	60,219
Ratio per 1,000 of A.I.F. in France 1916-18 ..	665·23	15·36	680·59	1·52	482·01	197·06

DISPOSAL OF CASUALTIES AT THE EXPEDITIONARY BASES
IN FRANCE

At the hospital centres on the Lines of Communication, or at the Expeditionary Bases in France the sick or wounded soldier reached an eddy. His further course was determined by various factors. Thus if the inefficiency was likely to be prolonged, and the patient could stand the journey, he was "cleared" at once to England. On the other hand if his disability was slight, or further movement fraught with special danger, he was retained in France. Pressure of casualties—in particular of wounded—on hospital accommodation and the current policy on the question of treatment in France also influenced his movement. The saving of transport might also be of determining importance, as might the need for prompt "return to duty" of the less severe types of casualty.⁶⁴ These factors are capable of approximate assessment.

TABLE No. 46

TIME SPENT IN HOSPITAL BY BATTLE AND NON-BATTLE
CASUALTIES

Period	Percentage of Total Cases Analysed		
	Wounds	Disease or Injury	Total
1 week and under ..	15.77	21.52	20.38
1-2 weeks	8.75	19.61	17.46
2-4 weeks	6.49	11.16	10.23
1 month	9.16	10.71	10.40
2 months	19.91	16.66	17.30
3 months	11.53	7.75	8.50
3-6 months	13.48	6.38	7.79
6-9 months	4.52	1.10	1.77
9-12 months	2.14	0.34	0.70
12 months	0.17	0.02	0.05
Over 12 months ..	1.88	0.13	0.48
Incomplete	6.19	4.62	4.93

Hospital accommodation required. "The allowance of vacant beds necessary for the normal fluctuation in the sick rate and the separation of cases in military hospitals *in peace time* is regarded

⁶⁴ This important matter is dealt with exhaustively in *Vol I* (the Gallipoli Campaign) and in *Chap. xv, Vol. II*.

as approximately 33 per cent." of the troops.⁵⁵ This requirement was very seldom exceeded in any theatre in the war.

Average stay in Hospital. The average time spent in hospital by soldiers for various forms of sickness and types of wounding is, from the experience of the A.I.F., only available for 1915 (the Gallipoli Campaign)⁵⁶ and the unusual circumstances of this campaign vitiate this experience as a useful basis for action.⁵⁷ From an analysis of 1,043,653 casualties in all theatres of war the British official historian presents the conclusion shown in Table 46.⁵⁸

Disposal of Battle and Non-Battle Casualties. Of the total casualties admitted to hospitals at the Expeditionary Bases of the B.E.F. in France 2.3 per cent. died. Of battle casualties admitted, 64 per cent. were evacuated across the Channel and of non-battle casualties 53 per cent. The disposal of the A.I.F. casualties at the Expeditionary Base in France and the rate (per thousand of the A.I.F. in France and Belgium) are given in the following tables.

TABLE NO. 47

DISPOSAL OF BATTLE AND NON-BATTLE CASUALTIES
FROM EXPEDITIONARY BASES 1916-1918

	1916	1917	1918	Total
<i>Admitted to Expeditionary Base Hospital</i>				
(a) Battle Casualties	28,391	53,836	48,733	130,960
(b) Non-Battle Casualties:				
i. From Army Area	32,389	62,340	52,565	147,294
ii. Local Admissions	1,123	2,135	2,267	5,525
Total Admissions	61,903	118,311	103,565	283,779
Died in hospitals, Lines of Communication and Expeditionary Base in France	1,422	2,560	2,352	6,334
Evacuated to U.K.	33,340	64,280	52,178	149,798
Discharged from Hospitals in France . .	27,141	51,471	49,035	127,647
Total	61,903	118,311	103,565	283,779

⁵⁵ *British Official Medical History, Statistics*, p. 50.

⁵⁶ Figures after that date were destroyed by inadvertence. See p. 862.

⁵⁷ See Vol. I, p. 375.

⁵⁸ *British Official History, Statistics volume*, p. 278, Table 8.

DISPOSAL OF BATTLE AND NON-BATTLE CASUALTIES IN THE EXPEDITIONARY BASE AREA,
FRANCE, 1916-1918

	Battle Casualties				Non-Battle Casualties				
	Total Admissions	Died in Hospital	Evacuated to U.K.	"Returned to Duty" ex-Hospital	Admissions		Died in Hospital	Evacuated to U.K.	Returned to Duty ex-Hospital
					From Army Area	Local			
1st Quarter ..	17	1	11	5	29	1	—	9	21
2nd Quarter ..	1,757	86	1,189	482	3,921	134	51	1,491	2,513
3rd Quarter ..	21,588	810	14,780	5,998	7,696	263	48	3,720	4,101
4th Quarter ..	5,029	323	3,357	1,349	20,743	725	103	8,783	12,582
Year 1916 ..	28,391	1,220	19,337	7,834	32,389	1,123	202	14,003	19,307
% of Total ..	—	0·93	14·76	5·98	—	—	0·13	9·16	12·63
1st Quarter ..	6,028	384	4,025	1,619	19,153	695	126	9,814	9,908
2nd Quarter ..	17,616	668	12,056	4,892	14,562	502	60	4,838	10,166
3rd Quarter ..	13,349	496	5,759	7,094	13,693	455	31	6,888	7,229
4th Quarter ..	16,843	746	11,051	4,446	14,932	483	49	9,249	6,117
Year 1917 ..	53,836	2,294	33,491	18,051	62,340	2,135	266	30,789	33,420
% of Total ..	—	1·75	25·57	13·78	—	—	0·17	20·15	21·87
1st Quarter ..	5,120	151	3,531	1,438	15,578	532	53	4,937	11,120
2nd Quarter ..	17,843	754	11,728	5,361	15,615	715	60	5,807	10,373
3rd Quarter ..	23,197	822	14,980	7,395	12,371	656	68	5,620	7,370
4th Quarter ..	2,573	156	1,434	983	9,001	364	288	4,051	5,026
Year 1918 ..	46,733	1,883	31,673	15,177	52,565	2,267	469	20,505	33,858
% of Total ..	—	1·44	24·19	11·59	—	—	0·31	13·42	22·16
Total ..	130,960	5,397	84,501	41,062	147,294	5,525	937	65,297	86,585
					152,819				
Ratio per 1,000 of A.I.F. in France (Table 38) ..	428·55	17·66	276·52	134·37	Ratio per 1,000 of A.I.F. in France 500·08		3·06	213·68	283·34

RETURN TO DUTY AFTER CASUALTY—BRITISH AND AUSTRALIAN
FIGURES

(1) *British*

The "Analysis of 1,043,653 casualties—all theatres".

(Statistical volume of the *British Official Medical History*, p. 278). The table gives the percentage of total cases analysed according to final disposal as follows:

TABLE No. 49

Disposal	Wounds	Disease or Injury	Total	Percentage of total analysed		
				Wounds	Disease	Total
Deaths ..	12,938	8,337	21,275	6.25	1.00	2.04
Returned to Duty ..	168,021	767,878	935,899	81.18	91.78	89.68
Discharged as Invalids	17,767	33,191	50,959	8.58	3.97	4.88
Discharged from Hos- pital (In- definite)	612	2,761	3,373	0.30	0.33	0.32
Incomplete Records .	7,029	21,297	28,326	3.40	2.55	2.71
Disease Changed .	609	3,213	3,822	0.29	0.38	0.37
Total ..	206,976	836,677	1,043,653	100.00	100.00	100.00

At the International Congress of Military Medicine and Pharmacy held in London on 6th May, 1929, the President of the Royal College of Surgeons, Lord Moynihan, gave the following figures based on official military estimates indicating the effectiveness of the medical services of Great Britain in the war:

Total wounded 1,983,748; Wounded returned to duty
1,602,033 (all theatres) = 80.7 per cent.
Total sick 3,494,165; Sick returned to duty 3,260,056 = 93.3 per cent.
Sick and Wounded returned to duty 4,862,089 = 88.7 per cent.

He added: "If the average strength of an army is roughly 288,000 men, the medical services were responsible for returning to duty no less than 16.8 full armies."

(2) *Australian*

Of A.I.F. casualties on the Western Front⁵⁹ (excluding

⁵⁹ For the 33 months, April 1916-November 1918.

those who died of wounds or disease) 38·8 per cent. were from wounding, the remainder 62 per cent. from sickness—approximately 2 wounded to 3 sick. Of all these, 67·2 per cent. rejoined their units: 19·4 per cent. of the casualties had not left Army Area: 36·3 per cent. rejoined from the Expeditionary Bases in France and 11·5 per cent. from the Home Base (England).

TABLE NO. 50

	Evacuated for Treatment	Rejoined Units	Percentage
Wounded (Except Died of Wounds)	130,849	53,277	40·7
Sick and Injured (Excluding Died)	206,576	173,672	84·0
Total	337,425	226,949	67·2
<i>Total returned to field duty to Dec. 1918.</i>			
From Field Medical Units (Army Area) ..		65,505	19·4
From Hospitals (Expeditionary Base) ..		122,457	36·3
From Hospitals (United Kingdom)		38,987	11·5
Total		226,949	67·2

In this small table the feature that arrests attention is the contrast in the figures for "return to duty" in the Australian and the British (and other European) armies, respectively—in particular that for return to duty after wounding. Here, the British figure for "rejoined unit" on the Western Front is almost double that of the A.I.F. Great pains have been taken to ensure that no slip has been made in the assembling and the interpretation of the figures, and it is believed that those given are substantially correct. The figures for "rejoined unit" are up to 31st December, 1918; they would be substantially increased through later rejoins but not so as radically to change the position. It is obviously desirable therefore to examine the factors involved in the difference.

It is not difficult to identify the most important ones. First and most obvious is the policy pursued by the Director of

The focal point of military statistics

Medical Services, Sir Neville Howse, endorsed by the G.O.C. and Chief of General Staff of the A.I.F., which insisted that the A.I.F. should be maintained as a striking force of the highest quality. Closely correlated with, and indeed the *fons et origo* of this and of the other factors in the situation, was the position of the A.I.F. within the Imperial Army, practically that of a fighting formation only. Line of Communication units which, as has been seen, in other armies absorbed a large proportion of recovered casualties, were in the A.I.F. confined to services requiring only a few thousand "B" and "C" class men. No labour battalions at the front or supply units at the base provided outlet for men physically below standard.

On this military situation, moreover, was imposed, as early as 1915, the "National" policy of return to Australia for recovery of "unfits"—the "three" or "six months' policy". Out of some 80,000 soldiers thus returned during the war considerably less than 5,000 returned to duty overseas.

The military and national involvements of this policy are studied in all the volumes of the history. The reader may particularly be referred to the brief "appreciation" of the matter by the Australian Official Historian given on *page 855, Volume II.*

THE A.I.F. IN BRITAIN

The disposal of A.I.F. casualties that arrived in England during 1915 and up to April 1916 was recorded in *Volume I (Chapter XXIII, Graph p. 511)*. During 1916-1918 there arrived 308,884 men,⁶⁰ either as reinforcements from Australia, or as sick and wounded from the Western Front. Of these *arrivals* 51.5 per cent. were new reinforcements, the remainder casualties from France.

Departures from England, for the Western Front, during these three years totalled 209,000, or 67 per cent. of total arrivals. In addition to these departures for France roughly 75,000 men embarked for return to Australia as invalids.

⁶⁰ Not including men on leave or special duty (*e.g.* for training). The figures also represent movements, not persons; the same men may be included several times as sick or wounded. Departures are here given in "round figures" because of discrepancies found in the figures, which are derived from several sources.

TABLE No. 51

RETURN TO DUTY OF A.I.F. AFTER CASUALTY ON THE WESTERN FRONT¹

(Quarterly Figures and Totals)

	Battle Casualties			Non-Battle Casualties				New Reinforcements taken on Strength	Total Re-joined Units and Taken on Strength
	Rejoined Unit from Field Medical Unit	Rejoined Unit from Expeditionary Base	Rejoined B.E.F. from U.K.	Total	Rejoined Unit from Field Medical Unit	Rejoined Unit from Expeditionary Base	Rejoined B.E.F. from U.K.		
1st Quarter	—	—	—	—	II	—	—	—	
2nd Quarter	97	—	4	101	1,590	1,200	261	3,953	
3rd Quarter	1,183	240	373	1,796	3,087	5,249	2,083	19,558	
4th Quarter	283	1,645	480	2,408	8,483	4,074	3,139	18,932	
Year 1916	1,563	1,885	857	4,305	13,171	10,523	5,483	42,443	75,925
1st Quarter	338	2,056	597	2,991	9,105	9,432	4,633	22,899	
2nd Quarter	966	2,314	817	4,097	5,850	10,715	4,390	19,888	
3rd Quarter	730	3,390	1,027	5,147	5,558	9,069	3,656	14,978	
4th Quarter	929	5,000	1,481	7,410	6,098	8,767	3,715	9,072	
Year 1917	2,963	12,760	3,922	19,645	26,611	37,983	16,394	66,837	167,470
1st Quarter	278	4,744	1,134	6,156	6,353	8,876	1,413	7,827	
2nd Quarter	255	6,822	1,864	8,941	6,017	12,924	1,041	9,152	
3rd Quarter	199	7,163	1,599	8,961	4,452	10,396	908	6,401	
4th Quarter	28	2,042	3,199	5,269	3,615	6,339	1,083	7,017	
Year 1918	760	20,771	7,796	29,327	20,437	38,535	4,535	30,397	123,231
Total ..	5,286	35,416	12,575	53,277	60,219	87,041	26,412	139,677	366,626

¹ The discrepancy between the figures given here and those on p. 709, Vol. II is due, chiefly, to the time lag in rejoining the unit in France after "discharge to duty" from hospital in U.K.; which was "ironed out" at the Expeditionary Base.

TABLE No. 52

STRENGTH OF THE A.I.F. IN THE UNITED KINGDOM, 1916-1918

Calculated on the basis of incoming and outgoing casualties and reinforcements. (It is, however, to be noted that men arriving on leave, or for special training, etc., are not included, and the actual strength sometimes differed greatly from that here shown.)

(Arrivals and Departures)

	Remaining in U.K.	Reinforce- ments	B. E. F. Sick and Wounded	Total	Died	Discharged U.K.	Returned to Australia	To B. E. F.	Total	Remaining end Quarter
1st Quarter	10,570	—	20	20	14	84	1,251	738	2,087	6,863
2nd Quarter	6,863	37,194	2,680	39,874	13	122	1,659	4,000	5,794	20,522
3rd Quarter	20,522	40,003	18,500	58,503	50	74	701	18,434	19,319	60,378
4th Quarter	60,378	25,683	12,140	37,823	101	86	2,950	38,404	41,541	66,752
Year 1916		102,880	33,340	136,220	178	366	6,621	61,576	68,741	
1st Quarter	66,752	6,623	13,839	20,462	256	140	1,021	23,396	24,813	77,492
2nd Quarter	77,492	14,408	16,804	31,302	103	160	4,647	26,660	31,570	69,386
3rd Quarter	69,386	8,014	12,647	20,661	66	180	9,657	18,222	28,125	55,535
4th Quarter	55,535	8,525	20,900	29,425	68	237	10,722	24,138	35,105	59,476
Year 1917		37,570	64,280	101,850	493	717	26,047	92,416	119,673	
1st Quarter	59,476	5,553	8,468	14,021	82	252	10,374	16,989	27,697	57,177
2nd Quarter	57,177	7,181	17,625	24,806	79	125	9,688	17,132	27,024	50,771
3rd Quarter	50,771	4,898	20,600	25,498	76	151	6,877	11,482	18,586	61,086
4th Quarter	61,086	1,004	5,485	6,489	285	82	15,481	9,488	25,336	43,896
Year 1918		18,636	52,178	70,814	522	610	42,420	55,091	98,643	
Total ..		159,086	149,798	308,884	1,193	1,693	75,088	209,083	287,057	

V

CLINICAL ANALYSIS OF CASUALTIES

It will be recalled that the War Office delegated the responsibility for dealing with war statistics to the Medical Research Committee. In a memorandum issued on 7th December, 1918, the Committee stated:

The adequate tabulation of the war medical statistics is a matter both of great practical importance and of scientific interest. It will provide much information for military purposes, and it should yield in addition many facts easily ascertained regarding the sequels to diseases and wounds, their complications and prognosis, the epidemiology of infections, and so on, on a scale quite unprecedented and in a form likely to increase both the extent and the accuracy of our medical knowledge.

Neither in Britain nor in Australia, however, was such a scheme carried out, the reason in both cases being the unwillingness of the Government to undertake the

**The Australian
statistical
records and
the British**

required moderate expenditure to complete it. The system proposed by the Medical Research Committee has been described. In Great Britain for financial reasons the complete scheme was cut down from an exact analysis of the whole of 11,096,338 casualties, battle and non-battle, sustained by the British forces in the war to a general statement of the totals and an exact analysis of 1,043,653 of assorted casualties from every theatre of war promiscuously assembled in a "sample" which represented some 10 per cent. of the total experience.

Australia, on the other hand in 1919 lost the chance of a complete analysis of her casualties by the failure of General Howse to carry out the recommendation of the Medical Collator,⁶¹ with the consequence that all the exact records, save those for 1915—which were imperfect—were retained in England and eventually, as already described, were inadvertently destroyed. They related almost exclusively to the Western Front.

Action was taken to provide a substitute analysis of A.I.F. non-battle casualties by the extraction of the detail from the

⁶¹ The immediate decision of pension claims is based chiefly on *direct evidence*, not on clinical (aetiological) principles or hypotheses. Gen. Howse refused to accept this principle and when recommended to procure the completion of the tabulation of the medical clinical records in 1919, expressed the view that they would be of no practical value, since the decision of pension claims would be based on the man's condition interpreted in the light of clinical principles and aetiology.

Admission and Discharge Books of medical units through which Australian casualties passed.⁶²

It was decided in consultation with the Commonwealth Statistician that a $33\frac{1}{3}$ per cent. count of admissions would give reasonable accuracy on which to base deductions. In order to examine the experience in the various zones of clearance and evacuation arrangements were made to prepare an analysis of admissions of non-battle casualties to field ambulances, casualty clearing stations, expeditionary base hospitals, and hospitals in England. As the A.I.F. units commenced to arrive in France at the end of March 1916, it was decided for the purpose of these statistics to cover these years, namely 1st April 1916 to 31st March 1919. Although it was considered that a count of one-third would give reasonable accuracy, a considerably larger proportion was counted.

The following table shows the actual count, the total admissions and the measure of weighting to bring the count to approximate totals of each disease entity.

Two special objects have been held in view. First to show the amount and nature of ill-health in the field and its effects on the army's numerical strength and, second, to show the beginnings and development of disease that creates the amount of pensioning and post-war treatment and determines their nature.

To promote exact knowledge concerning the causes of health and disease in the field, or of how that disease affected pensioning, a special classification was in 1924 adopted for this work.

The British Annual Reports on the Health of the Army differentiate somewhat vaguely, "general" diseases, including infections, from diseases of systems and organs, and injuries, "general" and "local." But it is clear that the time has come when a definitely scientific classification of disease on the basis of aetiology must be attempted. There is, indeed no longer excuse for delay;⁶³ and an effort so to classify the non-battle

⁶² The Admission and Discharge Books of British medical units that admitted A.I.F. patients as well as those kept by the Australian units were sent to the Australian War Memorial for this purpose.

⁶³ Sir Thomas Lewis writes: "The relation between cause and effect is a matter of common scientific interest; but it is of unusual importance to the clinical investigator owing to his preoccupation with problems concerning the origin of disease and its manifestations.

"When we enquire into the cause of a disease, we are often brought to consider a long chain of relevant circumstances, each circumstance in this chain leading to the next. Somewhere, however, in the chain there is a particular event, which is of cardinal importance to the individual, since it may be said to have set the chain of events in motion in him. There is an unfavourable reaction of the man to his environment; in the case of a given disease it may result from an inborn defect

casualties of the A.I.F. in the First World War was begun for *Vol. I* in 1924, and, so far as may be, is here consummated.

TABLE No. 53

DISEASES A. AND D. BOOK CALCULATIONS

Period April-March	A and D Book Count	Total Admissions (Approx)	Ratio of Number Counted to Total
FIELD AMBULANCE			
1916-17	40,800	73,324	1:1.797157
1917-18	45,865	81,401	1:1.7748
1918-19	31,577	56,396	1:1.78598
CASUALTY CLEARING STATION			
1916-17	19,984	52,711	1:2.63766
1917-18	25,110	58,535	1:2.33114
1918-19	16,141	40,683	1:2.52047
EXPEDITIONARY BASE			
1916-17	23,432	54,529	1:2.32711
1917-18	22,934	60,507	1:2.63831
1918-19	26,310	42,511	1:1.61577
HOSPITALS, U.K.			
1916-17	8,683	19,601	1:2.25739
1917-18	8,186	21,749	1:2.65685
1918-19	8,243	22,600	1:2.74172

The present classification cannot be exact; but attempt is made to select as its basis that element in each case (so far as ascertainable) which is *sine qua non* as a factor in the origin and development of the disease or an inevitable precedent thereto. Primary diseases therefore are classified by their initial or their prime cause or else by that element in their causality (where this is complex) that lends itself most to the influence of preventive measures. Secondary diseases are classified under "systems".

It is hoped that such tables may have their value in the effort

of the individual; in the case of another disease it may come from an encounter with abnormal environment. When we consider what we shall term the cause of a given disease in an individual, it is this circumstance to which we turn.

"But questions of cause and effect cannot always be regarded simply from the standpoint of pathogeny, for there are different though equally correct practical aspects. . . . Knowledge is complete when the whole sequence of events has been explored; but, if we are practical, we shall state the cause to suit the particular purpose we have in mind in seeking it." (*Clinical Science*, p. 9). The italics are the present author's.

See in this connection, *Vol. II*, p. 491n (views of Mr. Wilfred Trotter and Dr. Parkes Weber).

to prevent or limit disease and to estimate the probable liability of the nation in pensioning. Certain broad facts emerge pointing the way to a more exact system of "preventive" medicine in military service than that which held military "sanitation" to be contained in the disposal of refuse and the chlorination of the water consumed.

The neglect to make use of one of the various systems already devised needs explanation: any writer who lightly adds yet another classification to befuddle demography is open to censure. The excuse is, *first*, that the systems then extant (1924)—"*International List of Causes of Death*", *Nomenclature of Diseases* drawn up by the Royal College of Physicians of London—were based on morbid anatomy rather than on aetiology. *Second*, that the only aetiological system yet devised, the "*Standard Classified Nomenclature of Disease*" sponsored by the American Medical Association, appeared in 1933, after the first volume of the Australian History had appeared, and when the analysis on which our simple tables are based had been completed. The authors feel it, however, their bounden duty to urge the universal adoption in military medical history, of a standard system based on aetiology. In these tables we grope towards one.⁶⁴

CASUALTIES FROM WOUNDS

Owing to the destruction of the records no detailed clinical analysis of battle casualties in the A.I.F. has been possible. However, the analysis made from 1,043,653 cases for the British statistical tables includes Australian as well as British soldiers whose experience was very similar in France and Flanders. Of these 1,043,653 cases 206,976 were for "wounds"; and the succeeding table (reprinted by permission of the War Office) represents the most important information derived from the inquiry.

⁶⁴ A question of great importance in connection with medical statistics of the war concerns the accuracy with which the diagnosis as entered in the "A. and D. Books", and even as finally identified in the "statistical card", expressed the actual morbid condition or clinical syndrome. Concerning a set of tables compiled by him on a somewhat similar basis Col. A. B. Soltau, R.A.M.C., in the *Journal of the R.A.M.C.* for August, 1920, p. 152, says in relation to the diagnoses "P.U.O." and "Myalgia": "The pyrexia or muscular pain so frequently obscured the real issue that the final statistics of the war will not present any real indication of disease in the army."

He believed however that with modifications to provide for certain epidemic diseases, especially Trench Fever and Influenza, his own figures might be taken as "representing proportional wastage in sickness in the army concerned, and in the main were probably correct for the whole of the armies at this period."

It is believed that the statistics prepared for the present work have a similar value. More than this is not claimed. (See also Vol. II, p. 568.)

TABLE No. 54

PERCENTAGE OF BRITISH ADMISSIONS FOR WOUNDS, SHOWING
CAUSE, NATURE AND SITE OF WOUNDS (OTHER THAN FROM
GASSING), ACCORDING TO FINAL DISPOSAL

	Deaths	Re- turned to Duty	Dis- charged as In- valids	Dis- charged from Hospital (Inde- finite)	Records Incom- plete	Disease Changed	Percent- age of Wounds Analysed
<i>A. Cause of Wounds:</i>							
Rifle bullet, shrapnel, bomb, bayonet, or other instrument of war	7.88	77.76	10.06	0.26	3.75	0.28	75.16
Accidental or undefined ..	1.35	92.49	3.23	0.39	2.21	0.32	22.76
Self-inflicted	9.16	77.66	7.69	0.37	4.40	0.73	0.13
Old wound or injury ..	0.32	81.04	14.14	0.52	3.58	0.40	1.94
Total	6.25	81.18	8.58	0.30	3.40	0.29	100.00
<i>B. Nature of Wounds:</i>							
Flesh wound or contusion	6.13	83.71	6.12	0.26	3.49	0.30	79.32
Wound with fracture, major	12.17	48.19	35.22	0.40	3.83	0.19	9.10
Wound with fracture, minor	1.93	84.87	8.89	0.49	3.47	0.34	4.67
Dislocation or sprain ..	0.08	96.14	1.30	0.39	1.69	0.40	6.18
Undefined	25.70	66.84	4.06	1.07	2.26	0.07	0.73
Total	6.25	81.18	8.58	0.30	3.40	0.29	100.00
<i>C. Site of Wounds:</i>							
Head, face or neck ..	8.61	82.05	5.93	0.28	2.87	0.27	16.58
Chest	16.26	72.55	6.78	0.28	3.89	0.24	3.78
Abdomen	43.37	46.56	6.61	0.21	2.99	0.25	2.27
Back	9.03	83.25	4.33	0.34	2.78	0.28	6.27
Upper Extremity, not in- volving amputation ..	1.52	86.16	8.25	0.24	3.53	0.31	29.39
Lower Extremity, not in- volving amputation ..	4.11	84.20	7.48	0.31	3.57	0.32	38.26
Upper Extremity, with amputation	6.51	11.98	75.78	1.13	4.51	0.09	0.56
Lower Extremity, with amputation	11.15	6.55	77.43	0.58	4.15	0.13	1.49
Undefined	31.03	61.02	4.41	0.52	2.93	0.10	1.40
Total	6.25	81.18	8.58	0.30	3.40	0.29	100.00

Assuming that the proportions in Table 54 apply also to the A.I.F., the following table shows the site of wounds that incapacitated 135,422 men of the A.I.F. on the Western Front (and in respect of which 32,254 were in 1931 receiving pensions) :

TABLE No. 55

A.I.F. CASUALTIES ON THE WESTERN FRONT—WOUNDS
CLASSIFIED BY REGION OF THE BODY

Region	A.I.F. Woundings Excluding Died of Wounds %		Invalided and Discharged as unfit %		Pensioners in 1931 %		Percent- age of Group Pen- sioned
Head, Face, Neck	22,453	16·58	5,316	13·65	4,159	12·89	18·52
Chest	5,119	3·78	2,141	5·49	1,764	5·47	34·46
Abdomen	3,074	2·27	801	2·06	787	2·44	25·60
Back	8,491	6·27	1,338	3·44	1,591	4·93	18·74
Upper Extremities	39,801	29·39	12,173	31·24	9,421	29·21	23·67
Lower Extremities	51,812	38·26	12,966	33·28	9,817	30·44	18·94
Upper Extremity with Amputation	758	0·56	871	2·23	930	2·88	122·70
Lower Extremity with Amputation	2,018	1·49	1,929	4·95	2,081	6·45	103·12
Undefined or Mul- tiple	1,896	1·40	1,425	3·66	1,704	5·29	—
Totals	135,422	100·00	38,960	100·00	32,254	100·00	

Of the men discharged unfit for wounds of limbs, 52·73 per cent. were wounded on the left side of the body, and for those pensioned 53·38 per cent. Wounds of arms, hands, shoulder, legs, feet, knees, and also eyes are in each instance greater on the left side.

CLINICAL ANALYSIS OF THE FIGURES FOR DISEASE AND INJURY
IN THE A.I.F. ON THE WESTERN FRONT

The Director of the British Institute of Clinical Research, Sir Thomas Lewis, has stated:

To speak . . . generally, unless its pathogenesis is clear it is almost impossible to define a disease except, as in defining biological species, by a group of symptoms or signs which are supposed when taken as a whole to distinguish it.⁶⁵

This statement must be qualified if applied to nosological

⁶⁵ *Clinical Science*, p. 155.

tabulation. In the statistical investigation of medical problems *definition cannot be escaped*: for medical statistics are based in the last resort on an accepted nosological system, and presumes a *distinction in kind*. In statistics as a rule the process of definition must be determined by the purpose to be served. In medical military statistics this is to illuminate the problem of the *maintenance at strength of the Army in the field* and of the *determination of entitlement to pensions*.

The Tables (56-59) in fact relate to two problems of *prevention*: first, prevention of disease as a cause of immediate disability, diminishing the strength of the fighting force; and, second, prevention, in the national interest, of the sequelae of disease or the results of imperfect recovery, or other results that might diminish capacity for civil employment, and increase pension costs. These two purposes are sometimes antagonistic. The Commander-in-Chief may require only *immediate* ability for service, and complete recovery may not even be permitted by his needs. The post-war interests of the nation would deprive him of many useful soldiers because they are potential citizens; but the fact has to be faced that, if soldiers are too few there may be no post-war existence for the "nation" or its citizens.

Tables 56-8 refer to the various phases of A.I.F. history indicated at the heads of the columns. The entries across the page follow the course of casualties from enlistment to pensioning.⁶⁶

The columns

⁶⁶ On the technical side (as distinct from the narrative) the tables relate to descriptive matter in special chapters as follows:

Columns—

1. and 2. Recruits—reasons for rejection.
Vol. I, Chaps. ix and xxv, Vol. II, Chap. xxvi, Vol. III, Chap. xv.
3. Admissions in France to Field Ambulances, 1916-18.
Vol. II, Chaps. xi and xvii.
4. Admissions in France to Casualty Clearing Station.
Vol. II, Chaps. xvi and xviii.
5. Admissions in France to Base Hospitals.
Vol. II, Chaps. xiv and xv.
6. Admissions to British Hospitals in U.K. for the B.E.F.
Vol. II, Chaps. xv and xviii.
7. Invaliding from A.I.F. "With service".
Vol. II, Chaps. xvi and xxvi; Vol. III, Chaps. xiii to xvi.
8. Discharges from A.I.F. "No service".
Vol. I, Chaps. vi and xxiv; Vol. II, Chap. xxvi.
9. Members of the A.I.F. receiving pensions in 1931.
Vol. III, Chap. xvi.
10. Members of the A.I.F. who died while members. The rates of death are dealt with in *Vol. I, Chap. xxiv.*
Vol. II, Chap. xvi; deaths at sea, Vol. III, Chap. xiv.

Column 1 gives the reasons for which men applying to enlist in the A.I.F. in Australia were rejected at their medical examination. This examination was a preliminary weeding-out of men "unlikely to be fit for active service"—a very different function from that often attributed to it, of providing a guarantee of "perfect fitness". In Australia the sending overseas of unfit men and their return to Australia without service led to intense personal bitterness with serious repercussions on recruiting. It should be noted that several causes of rejection which were of great importance early in the war were later much modified. The most important were dental disease, errors of refraction, and venereal disease, together with "physical standards" which were modified by treatment or by acceptance of a lower standard.⁶⁷

The authorities for this and for *Column 2* are returns, collected from various sources and integrated, partly by voluntary work in the office of the D.G.M.S. in Melbourne during the war, but chiefly in the preparation of this present work, the figures of the analysis available being "weighted" to bring them up to 178,800 which is accepted as approximately the number of rejections.⁶⁸ It must, however, be borne in mind that, of the 178,800 rejected, many had presented themselves on several occasions—some up to five or six times. On the other hand, in the compulsory "call up", records would be vitiated through the opposite tendency, namely to magnify, or even to feign disabilities.

Column 2, Discharge from Camps of Training, is of interest chiefly for negative reasons—the smallness of the numbers discharged for sickness as compared with those (listed in another table) under the headings "Desertion", and "Services No Longer Required".

Columns 3 ("Causes" of admission to field ambulance), 4 (to C.C.S's), 5 (to Expeditionary Base Hospitals), and 6 (to Hospitals in the United Kingdom) are based on an actual count of entries in the Admission and Discharge Books, the count in each category selected being never less than 33½ per

⁶⁷ See also Sir James Barrett's admirable study in *A Vision of the Possible*.

⁶⁸ Full and exact figures from some States (especially South Australia) are counter-balanced by less accurate and even casual records from others.

cent. and in some cases much higher. The figures relate to the Western Front only. There is great difficulty in determining exactly the total number of men admitted to the Casualty Clearing Stations (Column 4) and any statement of it can only be approximate. The rise in total numbers at the Expeditionary Base (in Column 5) is a reflection of the large number of *local admissions*, from Reinforcement Camps and so forth. It is believed that the total of Column 6 represents closely the number of sick Australian soldiers who crossed the Channel. The figures include only *primary admissions* to Hospitals in the United Kingdom *from the B.E.F.*—they do not include admissions from camps of training (Depots in U.K., etc.).

Columns 7 and 8 represent the “causes” of invaliding. The totals are correct within something less than 10 per cent. The figures are taken from the “Board Papers” of men boarded after return to Australia as invalids, and include men who died subsequent to disembarkation but before discharge. They include also a large number (probably some 25 per cent.) of men who returned as “invalids” after the Armistice, and who, prior to this, would not have been invalided under the six months’ policy, but would mostly have passed back through the Command Depots and rejoined their units. The “classification” was carried out in 1924 by an experienced and conscientious clerk in the Base Records Office. The clinical analysis was made to a scheme which differed somewhat from that followed in the other columns, but, the Board Papers having since been destroyed (in accordance with the policy of the Department of Defence) it was not possible to repeat the analysis on more exact lines.

The most important nosological feature of these two columns is the distinction made between invaliding “with” and “without service”. Here is an expression of the struggle of the A.I.F. against dilution by unfits. Column 7 also shows the curious transformation, as time goes on, of wounds and disorders into disease. Thus Type III (Infections) falls from 57.16 per cent. of total evacuations to Field Ambulance to 24.97 per cent. of the total invalided; and on the other hand Type VII (Secondary Conditions and Metabolic Diseases) rises from 9.92 to 30.09. Viewed from the pathological stand-

point the "gassed" cases were merging with chronic bronchitis. "Shell-Shock W" ceases to exist. Medical evidence points, in the vast majority of cases, to a physiologically complete *restitutio ad integrum*. Yet more "invalids" were sent to Australia labelled "shell-shock" than were evacuated from the front. The explanation is that this disorder now took form in more or less clearly defined syndromes—hysterical, anxious, hypochondriacal, neurasthenic, confusional and so forth.

Column 9 (Causes of pensioning as seen in 1931) represents a clinical cross-section—the experience of one year. It is based on the results of the "K" card enquiry, made by the help of the Repatriation Department for the purpose of this history. The inquiry was into the claims for which pensions were being received in one year, 1931. It is described in Part VI of this chapter in which the figures of this column receive fuller treatment. The attribution ranges from certainty, as in loss of a limb or in an amoebic infection, to the "benefit of the doubt" in, say, some cases of arterio-sclerosis.⁶⁹

Column 10—causes of deaths in the A.I.F. other than from battle casualty—is based on figures supplied officially by Base Records and correct to within a decimal fraction.⁷⁰

The *tabulation*, however, is subject to some degree of error, which cannot now be assessed since the material, like that for the invaliding statistics, was destroyed by order of the Defence Department.

The fundamental cause of the imperfection of the Australian statistical records was that from beginning to end of the war and the peace they have been considered, by those entitled to exercise authority, to be of little or of no national importance.

Column 11—analysis of rate (per 1,000 of ration strength per annum) at which Australians were admitted to Expeditionary Base Hospitals in France makes possible some comparison

⁶⁹ The experience of America and Australia, in both of which the duration of attributability is indeterminate, would seem to make the simile of the widow's cruse appropriate. For a most useful study of the problem from the British standpoint the reader may be referred to the *British Official History of the War—Statistics*, which draws on material not available in Australian records.

⁷⁰ The figures for deaths at sea are less certain than the rest.

of Australian experience with that of other national armies. It relates, however, to the *Western Front only*.

In Table 56 (with 8 primary "types") and Table 57 (with 44 nosological "classes") the actual numbers are given as accurately as possible; in Table 58 (giving a specific clinical analysis into 181 diseases or disease "groups") only the proportional incidence per cent. of each item is shown.

In the first table (56) an attempt is made to discriminate broad social-biological types⁷¹ of disease and disorder through which the soldier was rendered "unfit for duty" in the social system to which, for the time, he belonged. These eight types were selected a sufficient number of years ago (1) to have made them liable in some respects to scientific supersession (2) to have proved them sufficiently consonant with the biological "constants" of modern communities to serve their purpose. The chief defect of an aetiological classification is, obviously, its mutability. But, *Tempora mutantur et nos mutamur in illis*.

As is obvious a wide field for possible error presents in the diagnoses entered in the records on which Tables 56-58 are based; not to speak of "P.U.O." or "N.Y.D." It is, however, believed that many errors are "ironed out" in the progressive sequence of the experiences analysed.⁷²

Note. Through inadvertence some of the tables have been set up in four places of decimals instead of two.

The authors venture to express the hope that this oversight in the method of presenting the conclusions reached by clinical analysis may not prejudice the interest of the study as an experiment in clinical science, nor be allowed to discount the value of the figures themselves. And in view of the extreme variations in the figures for the several disease groups their retention may perhaps facilitate comparisons between these.

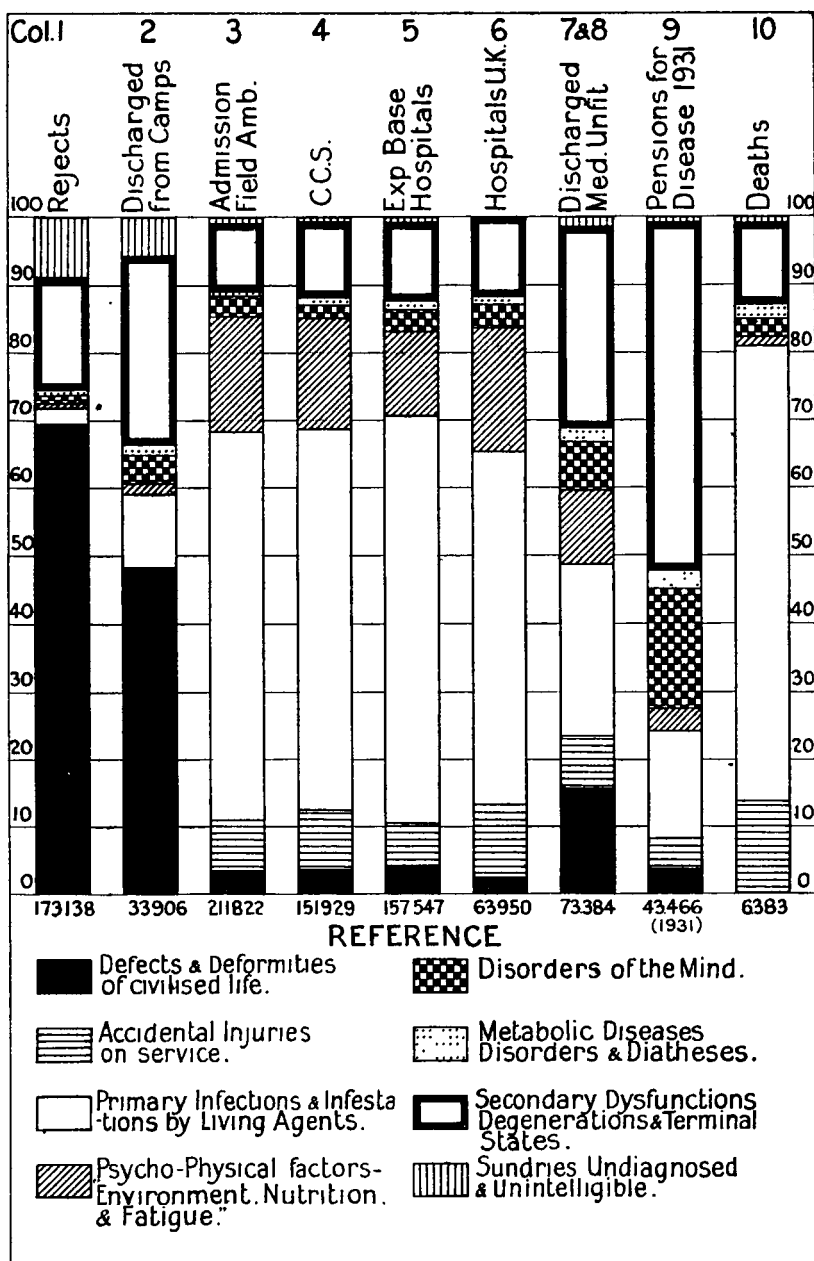
A "tablet" conspectus of the Tables. The following verbal diagram is intended to serve as liaison between the *tables of figures*, and the *events which they evaluate*. It should be read from below upwards.

⁷¹ The terms used to distinguish the several stages of analysis are, it is candidly acknowledged, not over-well chosen, but are retained for convenience.

⁷² The original entries in "A. and D. Books" comprised some 900 "diseases" or disabilities, based on an Army Council Instruction which authorised a list of permissible entries.

THE SIGNIFICANCE OF THE STATISTICAL TABLES

Column	The Movements of a "Casualty"	The Figures Represent	The Figures Indicate	Reason for the Movements of a Casualty
Column 10	1 in 5 "fit" recruits died on service.	The causes of death in the A.I.F. (60,239).	The number of deaths "due to war service" 1914-18.	<i>Dulce et decorum est pro patria mori.</i>
Column 9	Australian sailors and soldiers damaged by the war apply for a pension and for treatment to the Australian Repatriation Commission.	CAUSES for which in 1931 members of the Australian Naval and Military Forces were being pensioned for disability accepted as "due to or aggravated by" war service. (Number of such men in 1931, 43,466.)	Column 9 gives a clinical picture of the final results, pathological and clinical, of disorders and injuries "due to or aggravated by" war service in the Royal Australian Navy and the Australian Imperial Force.	Such men could claim the right of pension and treatment on account of any permanent damage sustained in or through the war.
Columns 7 and 8	If classified by Medical Board "unfit for duty within 6 months" men were sent to No. 2 Command Depot, or "Con. Camp" in Egypt, and returned to Australia as "invalids".	Men discharged in Australia from the A.I.F. (all fronts) as "unfit for military service" (73,384).	The secondary EFFECTS of damage sustained by the A.I.F. on service (all fronts).	By reason of non-recovery of fitness for active service seriously damaged soldiers might become "invalids".
Column 6	If not retained in France, they went per hospital ship to British hospitals in Great Britain and subsequently to A.I.F. "Auxiliaries" or Command Depots	The admissions from overseas, to British hospitals in England (63,950).	The COURSE of the more serious non-battle casualties sustained by the A.I.F. in France and Belgium.	A large proportion of these would require more prolonged and special treatment than could be undertaken at the seat of war.
Column 5	Those evacuated from Army Area "unfit for duty" went by hospital train to hospitals at the Expeditionary Bases, chiefly in France.	The admissions to General Hospitals, at the Expeditionary Base on the Western Front (157,547).	The clinical course of non-battle casualties sustained by the A.I.F. in France and Belgium.	The condition of the latter would commonly call for treatment in Base Hospitals at the seat of war.
Columns 3 and 4	Those who became "casualties" were cleared to field ambulances and casualty clearing stations.	The A.I.F. admissions in France to field ambulances (211,822) and to casualty clearing stations (151,929).	The CAUSES of "non-battle" casualty in the A.I.F. in France and Belgium.	Casualties at the front when evacuated for treatment, were classified either "slight", ("rest station") or "serious", ("for evacuation").
Columns 1 and 2	"Medically unfit" recruits were rejected: "fit" went overseas and most reached the front as "effectives".	Rejections in volunteers for the A.I.F. (178,800) and the sifting out of unfit recruits in camps of training in the war (33,906).	The HEALTH of Australian men between the ages of 19 and 35-40 and the nature of sickness in camps of training in Australia, 1914-18.	An "unfit" man is useless. War service created "non-battle" casualties in camps and "battle" and "non-battle" casualties at the front.



A GRAPHIC SUMMARY OF TABLES 56-58.

TABLE No. 56 (A social-biological discrimination of disease types)

A CLINICAL ANALYSIS OF DISABILITIES, EXCLUDING BATTLE CASUALTY, THROUGH WHICH MEN WERE RENDERED UNFIT, TEMPORARILY OR PERMANENTLY, FOR SERVICE IN THE A.I.F., OR BECAME ENTITLED TO PENSIONS

(In each case the percentage is shown under the total)

Types	Aetiological Types	In Australia		Western Front only. Apr. 1916-Mar. 1919				Australian Imperial Force				Average Annual Rate per 1,000 Ration Strength Admitted Expeditionary Base Hospital (Western Front only)
		Recruits. Causes of Rejection	Discharged from Camps of Training	Field Ambulances	Casualty Clearing Stations	Expeditionary Base Hospitals	Hospitals in U.K.	Invalids Returned to Australia Without Service	Returned to Front Line	Pensioned in 1931	Died while in A.I.F.	
		I	2	3	4	5	6	7	8	9	10	11
I.	Column Defects and deformities of civilised life (Classes 1-4)	120,265 69.46 Included under VIII	16,415 48.42 Included under VIII	7,349 3.53	5,616 3.69	6,617 4.19	1,627 2.54	8,141 13.80	3,395 23.56	1,296 2.99	4 0.06	22.0240
II.	Accidental injuries on service (Class 5)			15,648 7.38	13,261 8.73	10,371 6.57	6,843 10.70	4,791 8.12	1,021 7.09	2,325 5.35	892 13.96	34.5199
III.	Primary infections and infestations by living agents (Classes 6-19)	4,474 2.58	3,562 10.49	121,151 57.16	85,170 56.04	94,278 59.89	32,689 51.11	15,152 25.69	3,170 22.00	6,931 15.96	4,428 69.38	313.7942

IV. Psycho-physical factors, "environment", nutrition and fatigue (Classes 20-24)	265 0.16	585 1.73	36,636 17.28	25,571 16.85	19,763 12.52	11,791 18.44	6,398 10.85	1,465 10.17	1,416 3.25	51 0.80	65.7782
V. Disorders of the mind (Classes 25-28)	2,496 1.44	1,659 4.89	7,205 3.39	3,358 2.22	5,097 3.24	2,026 3.17	4,984 8.45	571 3.96	7,929 18.24	155 2.44	16.9637
VI. Metabolic diseases, disorders and diatheses (Classes 29-32)	1,383 0.80	605 1.79	1,217 0.58	1,318 0.86	1,867 1.17	736 1.16	800 1.51	360 2.50	1,098 2.52	139 2.19	6.2139
VII. Secondary dysfunctions and degenerations and terminal states (Classes 33-43)	29,830 17.23	9,414 27.77	21,007 9.92	16,790 11.06	19,184 12.19	8,138 12.72	17,803 30.19	4,278 29.69	22,460 51.67	680 10.64	63.8538
VIII. Sundries, undiagnosed, and untelligible (Class 44)	14,425 8.33	1,666 4.91	1,609 0.76	845 0.55	370 0.23	100 0.16	817 1.39	148 1.03	11 0.02	34 0.53	1.2323
Totals	173,138 100.00	33,906 100.00	211,822 100.00	151,929 100.00	157,547 100.00	63,950 100.00	58,976 100.00	14,408 100.00	43,465 100.00	6,383 100.00	524.3800

8	The "neurotropic-ectodermoses" (Groups 41-45) ¹ ..	3	—	354	233	357	90	—	—	—	16	27	1·19
9	Rheumatic (nodular) fever (Groups 46-47) ..	254	108	239	331	613	278	11	7	375	21	2·04	
10	Tuberculosis (Groups 48-49)	1,359	739	602	884	614	426	1,437	622	2,029	343	2·05	
11	Anthrax and Glanders (Group 50) ..	—	—	—	—	—	3	—	—	—	—	—	
12	Acute infections of eye, ear and nose (Groups 51-54) ..	87	349	2,671	2,370	2,675	862	20	6	716	9	8·90	
13	"Pyogenic" streptococcal and staphylococcal infections (Groups 55-57) ..	167	101	11,888	9,452	11,901	4,356	483	49	96	117	39·61	
14	The venereal infections (Groups 58-61) ..	1,653	1,183	13,105	19,094	29,610	241	628	536	37	5	98·55	
15	Transmitted through a specific "host" (Groups 62-71) ..	228	155	4,244	7,433	6,031	6,821	4,671	188	1,621	165	20·07	
16	Helminthiasis (excluding hydatid disease) (Groups 72-73) ..	—	—	43	40	10	5	—	—	2	—	0·03	
17	Skin infestations (Groups 74-76) ..	—	—	20,533	2,366	5,508	204	—	—	11	—	18·33	
18	Specific wound infections (Groups 77-78) ..	—	—	21	2	9	16	—	—	—	9	0·03	
19	P.U.O. (Pyrexia of uncertain origin) (Group 79) ..	—	—	24,593	13,023	7,281	2,946	41	3	8	15	24·24	
		4,474	3,562	121,151	85,170	94,278	32,689	15,152	3,170	6,931	4,428	313·81	
20	Specific physical agents (heat, cold, etc.) (Groups 80-85)	5	—	24,223	14,629	8,612	6,048	1,268	109	387	26	28·67	
21	Physiological hardship (Groups 86-92) ..	257	585	9,586	8,570	8,424	4,717	—	—	—	—	28·03	
22	Specific food defects and deficiencies (Group 93) ..	3	—	34	10	4	—	8	—	2	—	0·01	

¹ *Class 8 (Groups 41-45)* This class, as defined by Levaditi was adopted in *Vol. I* (1930) when our knowledge of human virus diseases was but slight, and is retained here for convenience. For similar reasons a "class" of diseases caused by "viruses" was not made. Encephalitis lethargica was discovered during the course of the war and a few cases occurred in the A.I.F. but did not come within the scope of preventive medicine. (*Vol. II, p. 505%.*)

TABLE 57—Continued.

Class	Diseases	In Australia		Western Front only. Apr. 1916-Mar. 1919				Australian Imperial Force			Average Annual Rate per 1,000 Ration Strength Admitted Expeditionary Base Hospital (Western Front only)	
		Recruits Causes of Rejection	Discharged from Camps of Training	Field Ambulances	Casualty Clearing Stations	Expeditionary Base Hospitals	Hospitals in U.K.	Invalids Returned to Australia With or Without Front Line Service	Pensioned in 1931	Died while in A.I.F.		
		1	2	3	4	5	6	7	8	9	10	11
23	Column											
	Acute endocrine dysfunctions (Group 94)	—	—	2	10	12	14	—	—	6	1	0.04
24	Psycho-physical exhaustion (Groups 95-97)"	—	—	2,791	2,352	2,711	1,012	—	—	—	7	9.02
		265	585	36,636	25,571	19,763	11,791	6,398	1,465	1,416	51	65.77
25	"Psycho-neuroses": primary-environmental (Groups 98-102)"	906	645	6,290	2,546	4,570	1,637	4,178	273	1,125	—	15.21
26	"Psycho-neuroses": secondary and end results (Group 103)"	—	—	21	19	8	56	118	17	6,213	—	0.03
27	Results of moral defects (Groups 104-107)	665	262	751	575	264	8	99	20	8	141	0.89
28	Organised mental diseases (Groups 108-115)	925	752	143	218	255	325	589	261	583	14	0.85
		2,496	1,659	7,205	3,358	5,097	2,026	4,984	571	7,929	155	16.98
29	Chronic disease of the ductless glands (Groups 116-118)	355	74	21	38	35	18	63	38	71	1	0.12
30	Disease due to hormonal effects (Groups 119-120)	13	20	13	20	33	30	38	14	57	39	0.11

	Neoplasms (Groups 121-122) "Allergy" and other functional diatheses (Groups 123-127)	66	13	167	277	278	154	—	—	—	—	0.92
31		949	498	1,016	947	1,521	534	716	282	938	22	5.06
32		1,383	605	1,217	1,318	1,867	736	890	360	1,098	139	6.21
33	Diseases of the nervous system (Groups 128-134)	1,457	826	746	581	561	409	574	348	356	96	1.87
34	The organs of special sense (Groups 135-141)	3,428	759	5,856	2,811	2,208	460	4,385	1,118	2,656	—	7.36
35	Diseases of the skin (Groups 142-145)	1,388	114	1,482	1,209	2,905	329	520	160	201	1	9.67
36	The digestive system (Groups 146-156)	3,256	1,553	4,534	5,461	5,387	2,917	1,439	395	2,692	174	17.92
37	The respiratory tract (Groups 157-160)	1,364	665	409	166	153	65	277	67	7,777	29	0.50
38	The cardio-vascular system (Groups 161-165)	12,706	2,319	695	825	980	809	5,617	1,248	2,343	189	3.26
39	Diseases of the reticulo-endo- thelial system (Groups 166- 168)	37	13	41	56	124	179	103	45	120	1	0.41
40	Diseases of the excretory sys- tem (Groups 169-172)	678	363	720	750	701	392	1,681	285	880	180	2.34
41	Diseases and disorders of the genital system (Group 173)	1,044	215	1,341	1,254	1,534	255	111	40	109	2	5.11
42	Chronic diseases of muscles, joints, bones (Groups 174- 176)	3,672	2,406	449	514	583	314	261	119	3,211	1	1.94
43	Impaired constitution (Group 177)	800	181	4,734	3,163	4,048	2,009	2,835	453	2,115	7	13.47
		29,830	9,414	21,007	16,790	19,184	8,138	17,803	4,278	22,460	680	63.85
44	Undiagnosed, unintelligible, ac- cidents in recruits, idiosyn- crasies (Groups 178-181) ..	14,425 ¹¹¹	1,666	1,609	845	370	100	817	148	11	34	1.24
	Grand Totals	173,138	33,906	211,822	151,920	157,547	63,950	58,976	14,408	43,466	6,383	524.38

¹¹ *Classes 24-6 (Groups 95-103)*. It will be observed that by 1931 (Column 9) the minor psychoses (psycho-neuroses) having, for the most part—as all relevant evidence indicates—entered the stage of chronicity are chiefly grouped together under the term "secondary neuroses and end results".

¹¹¹ It has not been found possible to avoid a large mass of unidentified causes of rejection. The results of accidents and operations are included.

A clinical analysis into distinct diseases, or groups of intimately related diseases
(The percentage only of the total number of cases is shown)

A clinical analysis into distinct diseases, or groups of intimately related diseases
(The percentage only of the total number of cases is shown)

Disease Groups	In Australia		Western Front only. Apr. 1916-Mar. 1919				Australian Imperial Force			Average Annual Rate per 1,000 Strength Admitted Expeditionary Base Hospitals (Western Front only)
	Recruits Causes of Rejection	Discharged from Camps of Training	Field Ambulances	Casualty Clearing Stations	Expeditionary Base Hospitals	Hospitals in U.K.	Invalids Returned to Australia With or Without Front Line Service	Pensioned in 1931	Died while in A.I.F.	
Column	1	2	3	4	5	6	7 and 8	9	10	11
Totals	173,138	33,906	211,822	151,929	157,547	63,950	73,384 ¹	43,466	6,383	524,3800
1 Military disability—Age	0.9917	0.6135	0.008	—	0.096	—	7.0151	—	—	0.5034
2 Normal disabilities due to ageing ..	0.1051	0.4955	0.017	0.022	0.021	0.003	—	0.0483	—	0.1101
3 Disorders of age	—	—	—	—	—	—	—	0.4555	—	—
4 Defective physique—	13.7890	5.8456	0.056	0.002	—	0.003	0.1526	—	—	—
5 Military standard	—	—	—	—	—	—	—	—	—	—
6 Naval and Air standard ¹¹	—	—	—	—	—	—	—	—	—	—
7 General	0.0491	0.1593	0.011	0.007	0.022	0.030	—	0.0230	—	0.1154
8 Genital—varicocele, etc.	3.9079	3.9039	0.229	0.340	0.522	0.278	0.3230	0.0897	—	2.7373
9 Errors of refraction	14.9592	6.0461	0.097	0.092	0.148	0.011	—	0.0253	—	0.7761
10 Acquired deformities—	—	—	—	—	—	—	—	—	—	—
Feet and hands	5.7607	9.3730	0.543	0.552	0.612	0.410	1.8873	0.4118	—	3.2092
Bodily—spinal	0.2801	0.0383	0.008	—	0.006	—	—	0.0943	—	0.0315

11	Nasal (septal) deformities	0.0139	—	0.068	0.097	0.190	0.124	—	0.0736	—	0.9963
12	Traumatic deformities (including abdominal scars)	7.8677	11.0187	0.322	0.524	0.730	0.336	1.5104	—	—	3.8280
13	"Unfit" (not due to service)	—	—	—	—	—	—	1.6557	—	—	—
14	Hernia (not due to service)	7.4929	4.2795	0.654	1.218	1.382	1.080	2.2266	1.1457	0.0627	7.2469
15	Varicose veins (the erect posture)	5.1289	5.4297	0.147	0.272	0.333	0.239	0.8299	0.6697	—	1.7462
16	Industrial disease—	—	—	—	—	—	0.008	—	—	—	—
17	Mining ¹¹	—	—	—	—	—	0.003	—	—	—	0.0157
18	Other ¹¹	0.0046	—	—	0.001	0.003	0.003	—	—	—	0.0052
19	Occupational diseases (civil)	—	—	—	—	0.001	—	—	—	—	0.7184
20	Dental caries, etc.	9.1101	1.1502	1.309	0.570	0.137	0.019	0.1104	0.0046	—	—
21	Accidental injuries on service	—	—	7.387	8.782	6.583	10.700	7.9200	5.3490	13.9746	34.5199
22	Enteric group of bacteria	0.0797	0.0206	0.034	0.060	0.072	0.399	1.2809	0.2830	2.8356	0.3776
23	Dysenteric group of bacteria	0.0121	—	0.387	0.918	0.596	2.546	1.2509	0.9824	1.8487	3.1253
24	Enterocolitis (acute)	—	—	0.286	0.673	0.446	0.686	0.1976	—	0.5953	2.3387
25	Cholera	—	—	—	—	—	—	—	—	0.2037	—
26	Brucella group	—	—	—	—	—	—	—	—	—	—
27	"Typhoid poisoning"	—	—	0.028	0.021	0.025	0.009	—	—	0.0313	0.1311
28	Amoebic infections	—	0.0206	0.001	0.010	0.010	0.011	—	0.0736	0.2193	0.0524
29	Diphtheria	—	0.0383	0.193	0.073	0.117	0.183	0.0763	0.0345	0.3447	0.6135
30	Acute tonsillitis	—	—	1.445	1.334	1.596	0.758	0.5083	—	—	8.3691
31	Scarlet fever	—	—	0.013	0.046	0.028	0.069	0.0109	0.0115	0.0627	0.1468
32	Cerebro-spinal fever	0.0121	1.4452	0.072	0.064	0.076	0.147	0.3952	0.4440	10.8256	0.3985
33	Pneumococcal pneumonia	0.0324	0.1976	0.325	0.813	0.703	1.850	0.9512	0.3428	20.8209	3.6864
34	"Broncho-pneumonia"	0.0017	—	0.130	0.326	0.941	0.954	0.2507	0.0598	11.6716	4.9344
35	Pleurisy (including empyema)	0.1773	0.6931	0.703	1.424	0.904	2.289	1.2619	1.0445	0.6110	5.2123
36	Coryza, laryngitis, acute bronchitis	—	—	4.186	4.875	4.803	6.843	4.4097	0.0046	1.7547	25.1860
37	Whooping cough	—	—	—	—	0.006	—	—	—	—	0.0315
38	"Influenza"	—	—	—	—	7.034	8.497	1.9377	0.2677	5.6870	36.8849

Groups

¹ The total 73,384 does not correspond with that given on Table 34 (71,048) since they are drawn from different sources. The figures here given are taken from the *Board Papers*, at Base Records in Australia. A number of men—probably 1,000-2,000—were discharged with no other diagnosis than "medically unfit", whether from disease or from wounds does not appear.

¹¹ The standards required for the Navy and Air Force differed greatly from those of the Army. It has not been found possible to obtain data adequate for statistical analysis but the heading has been retained to indicate the fact of difference.

¹¹¹ Occupational diseases and disorders were by no means unknown in Australia at the time. "Miner's phthisis" and "plumbism" had been the subject of Royal Commissions within the previous decade. The data available do not however permit of their discrimination.

^{1v} The records do not permit of statistical discrimination between the causes of dental unfitness.

TABLE No. 58—Continued

Groups	Disease Groups	In Australia		Western Front only. Apr. 1916-Mar. 1919				Australian Imperial Force			Average Annual Rate per 1,000
		Recruits Causes of Rejection	Discharged from Camps of Training	Field Ambulances	Casualty Clearing Stations	Expeditionary Base Hospitals	Hospitals in U.K.	Invalids Returned to Australia With or Without Front Line Service	Pensioned in 1931	Died while in A.I.F.	
		1	2	3	4	5	6	7 and 8	9	10	11
38	Column										
39	"Upper resp. tract inf." (U.R.T.I.)	0.1028	0.2389	0.203	0.233	0.301	0.216	0.5315	1.0005	—	1.5784
40	Measles and rubella	—	—	0.234	0.227	0.317	0.150	0.0259	0.0046	0.7207	1.6623
41	Mumps (epidemic parotitis)	—	—	1.573	0.521	0.767	0.102	0.0204	0.0138	—	4.0220
42	Variola	—	—	0.001	—	—	—	—	—	0.3760	—
43	Vaccinia	—	—	0.002	0.005	0.001	—	—	0.0046	—	0.0052
44	Encephalitis lethargica	—	—	0.001	0.002	—	0.008	—	0.0207	0.0470	—
45	Polio-encephalitis	—	—	0.001	—	—	0.008	—	0.0069	—	—
46	Herpetic diseases	0.0017	—	0.162	0.146	0.225	0.125	—	0.0046	—	1.1799
47	Rheumatic fever—acute form	0.1329	0.2596	0.021	0.074	0.266	0.324	—	0.1136	0.0157	1.3949
48	chronic form	0.0139	0.0590	0.002	0.143	0.123	0.111	0.0245	0.7500	0.3133	0.6450
49	Tuberculosis—pulmonary	0.7451	2.0616	0.284	0.575	0.388	0.658	2.7649	4.4149	5.3736	2.0346
50	other forms	0.0399	0.1180	—	0.007	0.001	0.008	0.0409	0.2531	—	0.0052
51	Anthrax and Glanders, tropical ulcer	—	—	—	—	—	0.005	—	—	—	—
52	Local acute infective diseases—	—	—	—	—	—	—	—	—	—	—
53	Of the eye	0.0075	0.2360	0.153	0.085	0.121	0.092	—	0.1795	0.1410	0.6345
54	Of the ear	0.0428	0.7934	0.701	1.174	1.248	1.010	0.0354	1.4632	—	6.5443
55	Of the mouth (including gingivitis)	—	—	0.407	0.301	0.329	0.246	—	0.0046	—	1.7252
56	Others (excl. "sepsis")	—	—	—	—	—	—	—	—	—	—
57	"Septic" infections—general	0.0936	0.0796	0.028	0.054	0.038	0.092	0.2753	0.0345	1.2220	0.1993
58	local	—	0.2183	2.704	2.674	1.829	1.950	0.1799	0.0782	0.6110	9.5909
	"Inflammation of connective tissue" (I.C.T.)	0.0029	—	2.881	3.494	5.687	4.769	0.2698	0.1081	—	29.8215
	Syphilis (specified)	0.0809	0.1003	0.025	0.043	3.233	—	0.3911	0.0483	0.0783	16.9532

59	Gonorrhoea (specified) ^{viii}	0.3015	0.9497	0.417	0.393	11.749	0.178	0.4197	0.0368	—	61.6094
60	Chancroid (specified) ^{viii}	—	—	—	—	1.245	—	—	—	—	6.5285
61	"Venereal disease" (unspecified) ^{viii}	0.5724	2.4391	5.744	12.131	2.507	0.199	0.7754	—	—	13.4008
62	Malaria (mosquito) ..	0.0687	0.3392	0.108	0.211	0.167	0.300	4.2666	2.2523	2.1776	0.8757
63	Filaria (mosquito) ..	0.0456	0.0796	0.001	—	0.004	0.003	0.0150	0.0184	—	0.0210
64	Trench fever (louse)	—	—	1.799	4.506	3.597	9.948	1.9882	1.2746	—	18.3900
65	Typhus fever (louse)	—	—	—	—	—	—	—	0.0940	—	—
66	Relapsing fever (louse)	0.0029	—	—	—	—	—	—	0.0069	0.0157	—
67	Sandfly fever (phlebotomus)	—	—	—	—	—	—	—	—	—	—
68	Bilharzia (snail) ..	—	—	0.001	0.004	—	0.003	0.1404	0.0874	—	—
69	Hydatid (dog) ..	0.0121	—	0.005	0.018	0.011	0.005	0.0545	0.0230	0.0313	0.0577
70	Jaundice—infective (rat, etc.)	0.0017	0.0383	0.090	0.153	0.135	0.406	0.1567	0.0667	0.2507	0.7079
71	Plague (rat flea)	—	—	—	0.026	0.006	0.008	—	0.0046	0.0157	—
72	Helminthiasis—intestinal ^{ix}	—	—	0.020	—	—	—	—	—	—	0.0315
73	Helminthiasis—anchylostomiasis	—	—	—	—	—	—	—	—	—	—
74	Pediculosis ..	—	—	0.149	0.019	0.263	0.005	—	—	—	1.3791
75	Scabies ..	—	—	9.404	1.455	3.106	0.294	—	—	—	16.2872
76	Tinea, etc. ..	—	—	0.140	0.083	0.126	0.020	—	0.0253	—	0.6607
77	Tetanus (specified) ..	—	—	0.005	0.001	0.006	0.025	—	—	0.1410	0.0315
78	Other wound infections (specified)	—	—	0.005	—	—	—	—	—	—	—
79	Pyrexia of Uncertain Origin	—	—	11.610	8.572	4.621	4.607	0.0600	0.0184	0.2350	24.2316
80	Traumatic abrasions (T.A. and S.T.A.)	—	—	3.572	2.450	0.798	0.467	—	0.0230	—	4.1846
81	Heat effects ..	—	—	0.023	0.005	0.001	—	0.0218	0.0046	0.3133	0.0052
82	Frost bite (specified) ..	0.0029	—	0.224	0.296	0.143	0.161	0.1090	0.0644	—	0.7499
83	Trench feet (including chilblains)	—	—	3.400	4.010	2.950	7.376	0.8762	0.7914	—	15.4692
84	Acute gastritis (hardship)	—	—	0.854	0.680	0.661	0.810	0.8694	0.0069	0.0783	3.4661
85	Acute diarrhoea (hardship)	—	—	3.362	2.189	0.913	0.643	—	—	0.0157	4.7876
86	"Rheumatism" and "arthritis"	—	—	1.810	1.382	1.007	1.038	7.7783	0.4785	0.0470	5.2805
87	The Rheumatoid syndrome—acute rheumatoid arthritis ..	0.0017	0.0383	—	—	0.010	0.053	—	—	—	0.0524

Groups

38 This group includes all diseases of the nose and accessory sinuses due to bacterial infection both acute and chronic. Acutely infective conditions are included with "coryza"; and this group is chiefly composed of frankly chronic disease as sinusitis, ethmoiditis, polyposis and "nasal catarrh" which are not in the ordinary sense "infective".

vⁱ Seldom discriminated in records.

vⁱⁱ Include all entries which would presumably indicate infection by the strepto- or staphylococci.

vⁱⁱⁱ The figures for U.K. Hospitals refer only to B.E.F. casualties. Local sick were not included in this analysis. In connection with V.D., see Chap. III.

v^{ix} The parasitic worms met with at No. 3 A.G.H. were: *Trematoda*, *Bilharzia haematobia*, *Trichuris trichiura*; *Cestoda*, *Tapeworms*; *Nematoda*, *Ascaris lumbricoides*, *Oxyuris vermicularis*, *Anthelmintic*; *Strongyloides stercoralis*.

TABLE No. 58—Continued

Groups	Disease Groups	In Australia		Western Front only. Apr. 1916-Mar. 1919				Australian Imperial Force			Average Annual Rate per 1,000 Ration Strength Admitted-Expeditionary Base Hospitals (Western Front only)
		Recruits, Causes of Rejection	Discharged from Camps of Training	3	4	5	6	7 and 8	9	10	
		1	2								
88	Fibrositis	0.1455	1.6870	1.344	2.610	2.673	3.667	1.0397	1.8704	0.0940	14.0167
89	"War nephritis"	—	—	0.410	0.717	0.933	2.280	—	—	—	4.8925
90	Broncho-nasal irritations and non-specific infections	—	—	0.660	0.595	0.557	0.236	—	—	—	2.9208
91	Minor cardio-vascular dysfunctions	—	—	0.296	0.315	0.164	0.091	—	—	—	0.8600
92	Undiagnosed (sympomatic)	0.0017	—	0.006	0.007	0.002	0.011	0.0095	—	0.1253	0.0105
93	Avitaminosis	0.0017	—	0.016	0.007	0.003	—	0.0109	0.0046	—	0.0157
94	Toxic goitre (acute)	—	—	0.001	0.007	0.008	0.022	—	0.0138	0.0157	0.0420
95	Acute psycho-physical conversions—effort syndrome "D.A.H.", etc.	—	—	0.572	0.990	1.633	1.557	—	—	—	8.5631
96	Acute psycho-physical exhaustion—"shock", "collapse", etc.	—	—	0.515	0.359	0.083	0.025	—	—	0.1097	0.4352
97	N.Y.D. Gas (gas effect syndrome)	—	—	0.231	0.299	0.004	—	—	—	—	0.0210
98	Prodromal symptoms—insomnia, etc.	—	—	0.014	0.016	0.004	0.008	—	—	—	0.0210
99	N.Y.D.N. incl. "shell-shock"	—	—	2.725	1.355	2.127	1.866	—	—	—	11.1536
	Psycho-neuroses—										
100	Hysterical	0.2310	0.1386	0.077	0.074	0.088	0.092	—	0.1933	—	0.4615
101	Psychasthenic and neurasthenic	0.2466	1.7431	0.152	0.232	0.672	0.589	2.6668	2.1787	—	3.5238
102	"Neuroses"	0.0456	—	0.002	—	0.010	0.008	3.4585	0.2163	—	0.0524
103	Neuroses (psycho- and somatic) chronic	—	—	0.010	0.013	0.005	0.144	0.1840	14.2939	—	0.0262
104	Alcoholism	0.3841	0.7727	0.024	0.016	0.010	0.008	0.0327	0.0184	0.4543	0.0524
105	Self inflicted wounds	—	—	0.331	0.362	0.157	0.005	0.1294	—	1.7547	0.8233

TABLE No. 58—Continued

Groups	Disease Groups	In Australia		Western Front only. Apr. 1916-Mar. 1919				Australian Imperial Force			Average Annual Rate per 1,000
		Recruits Causes of Rejection	Discharged from Camps of Training	Field Ambulances	Casualty Clearing Stations	Expeditionary Base Hospitals	Hospitals in U.K.	Invalids Returned to Australia With or Without Front Line Service	Pensioned in 1931	Died while in A.I.F.	
		1	2	3	4	5	6	7 and 8	9	10	
133	Diseases of the peripheral nerves	0.0046	—	0.099	0.104	0.086	0.100	0.0382	0.0552	—	11
134	Disorders of the sympathetic nervous system	—	—	—	—	0.006	0.013	0.0123	0.0138	—	0.4510
135	"Defective vision"—(excluding wounds and refractive errors)	—	—	1.186	0.200	0.126	0.016	3.4871	1.2746	—	0.0315
136	Diseases of the eye—external	0.0029	0.0590	0.626	0.754	0.716	0.330	—	0.8857	—	0.6607
137	Diseases of the eye—internal	—	—	0.053	0.109	0.135	0.111	—	0.1795	—	3.7546
138	Unspecified "eye conditions", etc.	0.0751	—	0.418	0.089	0.072	0.036	—	0.1633	—	0.7079
139	"Deafness"—cause unspecified	1.2747	2.1412	0.319	0.539	0.281	0.185	—	3.3843	—	0.3776
140	Internal diseases of ears (including "otitis" and "otorrhoea")	0.3991	0.0383	0.162	0.160	0.071	0.042	4.0118	0.2232	—	1.4735
141	Nose and throat, unclassified	0.2282	—	—	—	—	—	—	—	—	0.3723
142	Psoriasis	0.0150	0.1770	0.075	0.130	0.305	0.120	—	0.0598	—	—
143	Prurigo and pruritis	—	—	0.017	0.009	0.011	0.008	—	0.0138	—	0.5113
144	Seborrhoea	—	—	0.143	0.169	0.640	0.169	—	0.0368	—	0.0577
145	"Dermatitis" (including "eczema" and "skin trouble") ⁴¹	—	—	—	—	—	—	—	—	—	3.3560
146	Chronic diseases of mouth and throat	0.7867	0.1593	0.465	0.488	0.888	0.217	0.9266	0.3520	0.0157	4.6505
147	Chronic "dyspepsia" and indigestion	0.0965	0.1386	0.162	0.100	0.079	0.099	—	0.0368	0.0313	0.4143
148	Peptic ulcer and hyperchlorhydria	0.1623	1.3666	0.083	0.088	0.111	0.153	0.3543	1.4563	0.1880	0.5821
149	Enteroptosis, etc.	—	—	0.040	0.060	0.056	0.122	0.0055	1.0169	0.1880	0.2937
									0.2025	—	—

150	Appendicitis	0.0843	0.9910	0.589	1.260	0.924	2.170	1.0983	0.7546	1.8957	4.8453
151	Enterocolitis—chronic diseases	0.0260	0.0590	0.086	0.074	0.092	0.059	0.0150	0.9157	—	0.4824
152	Diseases of the rectum (including "piles")	1.4411	1.5484	0.993	1.791	1.953	1.745	0.8994	0.8328	0.0783	10.2411
153	Chronic constipation	—	0.0796	0.054	0.054	0.093	0.050	—	0.1196	—	0.4877
154	Obscure abdominal "trouble" (including "adhesions")	0.0474	0.2566	0.111	0.142	0.093	0.120	—	0.5821	0.2193	0.4877
155	Cholelithiasis	0.0064	0.1003	0.022	0.023	0.019	0.016	0.0531	0.2508	0.0470	0.0996
156	Other diseases of the liver	0.0168	0.1003	0.001	0.003	0.002	0.027	0.0736	0.0253	0.0783	0.0105
157	Diseases of fauces and larynx	0.2674	0.2949	0.065	0.046	0.046	0.016	—	0.9272	0.1410	0.2412
158	Chronic disease of bronchi (including "fibrosis")	0.2894	1.4275	0.043	0.041	0.011	0.045	0.3257	15.3959	0.3133	0.0577
159	Chronic alveolar disease—emphysema	—	—	0.009	0.018	0.020	0.038	0.0401	0.7408	—	0.1049
160	Chronic lung disease unspecified	0.2310	0.2389	0.075	0.003	0.020	0.003	0.0940	0.8282	—	0.1049
161	Valvular diseases of the heart (specified)	0.5400	0.1770	0.125	0.294	0.425	1.002	—	1.7922	0.3447	2.2286
162	"Diseases of the circulatory system" undefined (including dilated heart and heart failure) ^{xii}	1.3908	0.0206	0.164	0.208	0.095	0.120	0.0491	0.6879	2.2246	0.4982
163	"Heart trouble" undefined (including tachycardia, but excluding "D.A.H." and effort syndrome)	5.1959	6.5033	—	—	—	0.003	8.9502	2.3237	—	—
164	Diseases of the arteries	0.1975	0.1386	0.021	0.022	0.056	0.059	0.2262	0.3405	0.3447	0.2937
165	Diseases of the veins	0.0139	—	0.019	0.020	0.046	0.080	0.1294	0.2462	0.0470	0.2412
166	Diseases of the spleen	—	—	—	—	0.002	—	0.0082	0.0345	—	0.0105
167	"Anaemia" (excluding pernicious anaemia)	0.0214	0.0383	0.019	0.037	0.077	0.280	—	0.2347	—	0.4038
168	Diseases of the lymphatic system	—	—	—	—	—	—	0.1935	0.0069	0.0157	—
169	Bright's disease of the kidneys ^{xiv}	0.3044	0.2979	0.003	—	—	0.005	1.8396	1.5920	2.6163	—
170	Other diseases of the kidneys (including abscess and pyelitis)	—	0.0590	0.012	0.022	0.017	0.050	0.4892	0.1449	0.0627	0.0891
171	Diseases of the bladder	0.0428	0.1976	0.253	0.337	0.310	0.371	—	0.2462	0.1253	1.6256
172	Urethral stricture	0.0445	0.5161	0.073	0.134	0.118	0.188	0.3502	0.0414	0.0157	0.6188
173	Hydrocele, orchitis, etc. ^{xv}	0.6030	0.0341	0.633	0.825	0.974	0.399	0.2058	0.2508	0.0313	5.1075

Groups

145 "Dermatitis" was the common general diagnosis at the front, "skin trouble" at the base!

162 ^{xiii} In this matter of heart disease A.I.F. statistics are useless. From front line to base medical officers responsible for entries in "A. and D. Books" failed in their duty.

169 ^{xiv} The figures include all types of intrinsic disease of the kidneys, acute and chronic, and include such entries as "kidney trouble" and "nephritis".

173 ^{xv} Excluding varicocele.

TABLE No. 58—Continued

Groups	Disease Groups	In Australia		Western Front only. Apr. 1916-Mar. 1919				Australian Imperial Force			Average Annual Rate per 1,000 Ration Strength Exposed to Expedi- tary Base Hospitals (Western Front only)
		Recruits Causes of Rejection	Discharged from Camps of Training	Field Ambulances	Casualty Clearing Stations	Expedi- tary Base Hospitals	Hospitals in U.K.	Invalids Returned to Australia With or Without Front Line Service	Pensioned in 1931	Died while in A.I.F.	
		1	2	3	4	5	6	7 and 8	9	10	11
174	Column	0.0641	0.0383	0.143	0.180	0.203	0.264	0.0259	0.1679	—	1.0545
175	Diseases of muscles and tendons ^{xvi}	0.4008	0.1386	0.063	0.152	0.123	0.153	0.1199	0.0782	—	0.6450
176	Diseases of the bone and joints (local)	1.6559	6.9191	0.006	0.007	0.044	0.073	0.3720	7.1412	0.0157	0.2307
177	Chronic arthritis "rheumatism" ^{xvii} osteo- arthritis ^{xviii} "impaired constitution", etc.	0.4621	0.5338	2.235	2.082	2.569	3.141	4.4805	4.8659	0.1097	13.4713
178	Not diagnosed (excl. N.Y.D.N.). In re- cruits includes results of accident	8.3315	4.9136	0.757	0.554	0.222	0.030	1.3150	0.0184	0.5327	1.1641
179	Unintelligible ^{xix}	—	—	0.002	0.002	0.001	—	—	0.0069	—	0.0052
180	Human idiosyncracies ^{xviii}	—	—	—	—	0.010	—	—	—	—	0.0324
181	Human devotion—Blood donors ^{xix}	—	—	—	—	0.001	0.127	—	—	—	0.0052
		100.0000	100.0000	100.000	100.000	100.000	100.000	100.0000	100.0000	100.0000	524.3800

Groups

174 ^{xvi} Including bursitis, myositis, "muscle trouble", etc.176 ^{xvii} Including osteo-arthritis and spondylitis; excluding rheumatoid arthritis.180 ^{xviii} For example flying sickness.181 ^{xix} Donors of blood were granted special facilities for recovering but were not entered in the A. and D. Books. It is desirable that they should be.

TABLE No. 59

DEATHS FROM NON-BATTLE CASUALTIES IN THE A.I.F. AND A.N. & M.E.F. (IN AUSTRALIA AND ABROAD) DURING THE GREAT WAR—CLASSIFIED BY CAUSE AND LOCATION

I. General Causes—by Types

Type	Ætiological Types	A.N. and M.E.F.	Re- cruits	In- valids	Egypt	M.E.F.	E.E.F.	B.E.F.	U.K.	At Sea	Other Places	Total Deaths	Percent- age of Total
I.	Defects, and deformities of civilised life (Classes 1-4)	—	—	1	—	—	—	2	1	—	—	4	0·06
II.	Accidental injuries on service (Class 5)	4	108	54	98	10	225	404	137	46	6	892	13·96
III.	Primary infections and infec- tions by living agents (Classes 6-19)	13	704	262	474	258	168	1,042	1,068	267	172	4,428	69·38
IV.	Psycho-physical factors—"en- vironment", nutrition and fatigue (Classes 20-24)	—	2	4	9	1	—	11	9	12	3	51	0·80
V.	Disorders of the mind (Classes 25-28)	2	36	21	19	1	2	33	23	15	3	155	2·44
VI.	Metabolic diseases, disorders and diatheses (Classes 29-32)	—	20	32	12	—	—	13	53	8	1	139	2·19
VII.	Secondary dysfunctions and degenerations and termi- nal states (Classes 33-43)	7	69	107	84	21	5	134	177	63	13	680	10·64
VIII.	Sundries, undiagnosed, and un- intelligible (Class 44) . .	2	—	—	2	—	1	7	2	1	19	34	0·53
		28	939	481	698	291	201	1,646	1,470	412	217	6,383	100·00

Authority: Personal files at Base Records.

TABLE No. 59—Continued

II. Deaths classified by classes of disease related through their common predominant aetiological factors

Class	Disease Classes	A.N. and M.E.F.	Re- cruits	In- valids	Egypt	M.E.F.	E.E.F.	B.E.F.	U.K.	At Sea	Other Places	Total Deaths	Percent- age of Total
2.	Structural defects and deformities (Groups 4-15) ..	—	—	1	—	—	—	2	1	—	—	4	0.06
5.	All accidental injuries on service (Group 20) ..	4	108	54	98	10	25	404	137	46	6	892	13.96
6.	Gastro-intestinal infections (Groups 21-27) ..	3	17	8	76	146	25	18	29	19	25	366	5.74
7.	Faucial and respiratory tract infections (Groups 28-40)	2	641	100	303	95	52	972	884	186	116	3,351	52.50
8.	The neurotropic ectodermoses (Groups 41-45) ..	—	—	—	19	—	—	3	1	1	3	27	0.42
9.	Rheumatic (nodular) fever (Groups 46-47) ..	—	1	5	1	1	—	2	6	4	1	21	0.33
10.	Tuberculosis (Groups 48-49)	2	28	123	13	3	—	19	102	41	12	343	5.38
12.	Infections of eye, ear, nose (Groups 51-54) ..	—	—	2	2	—	—	2	3	—	—	9	0.14
13.	"Septic" (pyogenic) infections (Groups 55-57) ..	1	15	9	23	7	3	17	29	8	5	117	1.83
14.	The venereal contagions (Groups 58-61) ..	—	—	2	1	—	—	—	2	—	—	5	0.08
15.	Transmitted through an insect or other host (Groups 62-71) ..	5	2	9	36	5	83	2	6	7	10	165	2.59
18.	Specific wound infections (Groups 77-78) ..	—	—	3	—	1	—	2	3	—	—	9	0.14
19.	P.U.O. (Pyrexia of uncertain origin) (Group 79) ..	—	—	1	—	—	5	5	3	1	—	15	0.23
		13	704	262	474	258	168	1,042	1,068	267	172	4,438	69.38

20.	Specific physical agents (heat or cold) (Groups 80-85)	—	2	—	7	—	—	5	1	10	1	26	0.41
21.	Physiological hardship (Groups 86-92)	—	—	3	2	—	—	3	8	—	1	17	0.26
23.	Acute endocrine dysfunctions (Group 94)	—	—	1	—	—	—	—	—	—	—	1	0.02
24.	Psycho-physical exhaustion (Groups 95-97)	—	—	—	—	1	—	3	—	2	1	7	0.11
		—	2	4	9	1	—	11	9	12	3	51	0.80
27.	Results of moral defects (Groups 104-107)	2	34	19	18	1	2	33	17	12	3	141	2.22
28.	Organised mental disease (Groups 108-115)	—	2	2	1	—	—	—	6	3	—	14	0.22
		2	36	21	19	1	2	33	23	15	3	155	2.44
29.	Degenerations of the endocrine glands (Groups 116-118)	—	1	—	—	—	—	—	—	—	—	1	0.02
30.	Disorders of hormonal secretion (Groups 119-120) ..	—	6	9	4	—	—	1	17	2	—	39	0.61
31.	Neoplasms (Groups 121-122)	—	11	20	8	—	—	6	26	6	—	77	1.21
32.	"Allergy" and other functional diatheses (Groups 123-127)	—	2	3	—	—	—	6	10	—	1	22	0.35
		—	20	32	12	—	—	13	53	8	1	139	2.19

TABLE No. 59—*Continued*

II. Deaths classified by classes of disease related through their common predominant aetiological factors

Class	Disease Classes	A.N. and M.E.F.	Re- cruits	In- valids	Egypt	M.E.F.	E.E.F.	B.E.F.	U.K.	At Sea	Other Places	Total Deaths	Percent- age of Total
33.	Diseases of the nervous system (Groups 128-134) ..	1	16	9	7	4	—	21	25	12	1	96	1.50
35.	Diseases of the skin (Groups 142-145)	1	—	—	—	—	—	—	—	—	—	1	0.02
36.	The digestive system (Groups 146-156)	—	19	20	26	7	3	27	54	14	4	174	2.71
37.	The respiratory tract (Groups 157-160)	—	3	2	5	1	—	5	9	3	1	29	0.45
38.	Diseases of the circulatory system (Groups 161-165) ..	1	18	38	23	4	—	44	37	19	5	189	2.96
39.	Diseases of the reticulo-endothelial system (Groups 166-168)	—	—	—	—	—	—	—	1	—	—	1	0.02
40.	Diseases of excretory system (Groups 169-172)	4	12	32	22	5	1	37	50	15	2	180	2.82
41.	Diseases and disorders of genital system (Group 173)	—	—	2	—	—	—	—	—	—	—	2	0.03
42.	Chronic diseases of muscles, joints, bones (Groups 174-176)	—	—	1	—	—	—	—	—	—	—	1	0.02
43.	Impaired constitution (Group 177)	—	1	3	1	—	1	—	1	—	—	7	0.11
		7	69	107	84	21	5	134	177	63	13	680	10.64
44.	Human idiosyncrasies, undiagnosed, unintelligible (Groups 178-181)	2	—	—	2	—	1	7	2	1	19	34	0.53
	Total	28	939	481	698	291	201	1,646	1,470	412	217	6,383	100.00

Statistical life history of the A.I.F. The following table represents a statistical balance, so to speak, of the excursion and returning of the First A.I.F. in terms of *individuals who embarked, as distinct from the number of embarkations*. These figures, supplied by the Base Records Office, are the result of a check of the *personal records of all soldiers*, undertaken in 1936 at the request of the Commonwealth Statistician for comparison with those shown by the census of 1933. In certain details (as of deaths and discharges overseas) they differ slightly from those given in previous tables, but the differences are chiefly in the method of statement, and are in fact, negligible. The *total figure* for the out-going and home-coming A.I.F. here given can be taken as exact.

TABLE No. 60

EXCURSION AND REPATRIATION OF THE A.I.F.

Soldiers and Nurses who embarked for overseas	325,562
<hr/>	
Soldiers who returned to Australia	258,011*
Nurses who returned to Australia .. .	1,665
Discharged abroad .. .	7,030
Killed in action .. .	40,234
Died of wounds .. .	13,262
Died other causes .. .	5,360
Total .. .	325,562

* Includes 492 who died prior to discharge from the A.I.F.

Note: The figure 325,562 rectifies that given under *embarked* in Table 28. The circumstances of this enquiry call for a note. A question in the census of 1933 had as its purpose that of "computing the expectation of life of ex-members of the A.I.F. in Australia, . . . so that it may be possible to make a comparison . . . at each age for Returned Soldiers and the general population". When the returns were analysed it became evident that any conclusion would be vitiated by the fact that neither the exact number of repatriated soldiers nor their age were known. Figures compiled by the Bureau (see Table 28) related to *embarkations*, not to *individuals*. To settle these points a complete count of all individual files held was made in 1936 by the Base Records Office at a cost of less than £600. On the figures thus obtained and the census returns were based the conclusions which resulted in the creation of the "Service Pension". It is a matter for regret that the small additional expenditure was not incurred which would have permitted a complete analysis of the files.

VI

THE STATISTICS OF PENSIONING

The records of the Australian Repatriation Commission do not lend themselves to exact study from a medical standpoint.

**The place of
"medicine" in
the pension
problem**

The reason for this is associated with the question whether, in a technical department, the professional or the clerical element shall direct and determine the policy and procedure of the Department, and shall advise the Minister.

The medical service has not been relied on for this and one consequence has been a failure on the part of the pensions department to provide for the scientific, and in particular the statistical recording and study of the medical problems of pensioning as a domain of scientific medicine. In the first place, *the records of the Department, State and Central, are strictly personal and individual* with scant provision for correlation; and as a consequence no exact and comprehensive classification of the departmental records of pensions by *cause of disability* was provided for. To offset this from 1924 onwards it was provided that all new pensions should be tabulated by cause, and the total of these included in an annual report. But even so the nosological system adopted was clinically defective; it was indeed created, not as the result of a considered scheme, designed with a medical purpose, but chiefly to meet administrative requirements or to subserve parochial or socio-political purposes. It was, *e.g.*, inadequate to assist, except in certain broad lines of discrimination, as between battle and non-battle casualty, in the determination of the professional questions that are the fundamental basis of pensioning. Except on broad lines, for example, the vital question of the relative importance from the standpoint of pensioning and post-war treatment, of the several disabilities accepted as "due to or aggravated by" the soldier's war experience, or the death-rate in pensioners, cannot now be answered.

One reason why the British method of adjusting claims worked out to a more equable and consistent result than in other belligerent nations is the fact that those charged with the administration of pensioning and the after care of soldiers recognised the importance of study of the medical problems and

of ensuring that material for such study was available in the department's records. They are fully available and admirably presented in the statistical volume of the *British Official Medical History*.⁷³

The following comparative figures for the pensions granted after the First World War by the countries named are given by Miss Katherine Mayo in her book *Soldiers What Next!* (p. 162).

TABLE No. 61

PENSIONS—COMPARATIVE FIGURES

Country	Number of Men in Combatant Service	Number of Men Pensioned in 1932	Expenditure on Ex-Servicemen's Benefits, 1932*
U.S.A.	1,390,000 ¹	771,399 ¹	\$417,738,652 ¹¹
United Kingdom	4,970,902 ¹¹	480,840	£49,436,363 ¹¹¹
Italy	5,600,000 ¹¹¹	210,000	Lire 1,155,111,888 ¹²
France	7,932,000 ¹²	1,098,047	Franc 7,598,011,000 ²
Germany	12,000,000 ²	820,403	R.M. 1,200,000,000 ²¹

* Enquiry shows that the amounts in the last column must cover dependants as well.

¹ Ayres, *War With Germany*, p. 101.

¹¹ *Statistics of the Military Effort of the British Empire During the Great War*, The War Office, March, 1920, p. 363.

¹¹¹ Authority of the Italian Government, March, 1933.

¹² Edmond Michel, *Les Dommages de Guerre de la France et leur Reparation*, Editions Berger-Levrault, Paris, 1932, p. 497.

² Authority of the German Labour Ministry, August, 1933.

²¹ Hearing before the joint Congressional Committee on Veterans' Affairs, December, 1932, p. 26.

¹¹¹ Annual Report, Administrator of Veterans' Affairs, 1932, pp. 156 and 160. This figure does not include bonus or insurance expenditures, or hospital construction. The figures for the other countries include all expenditures, excepting only the figures of Italy, which omit the costs of three great Institutes.

¹¹¹¹ Authority of the British Ministry of Pensions, 1933.

¹² Authority of the Italian Government, 1933.

² Authority of the French Ministry of Pensions, March, 1933.

²¹ Authority of the German Ministry of Labour, 1933. Figures of 1931.

Taking the rate of exchange as it stood on 31st December, 1932, these amounts would be equivalent to:

	Dollars		Dollars
U.S.A.	417,738,652	France	296,797,304
United Kingdom . .	231,280,724	Germany	290,476,285
Italy	60,795,362		

The following extracts from the *19th Annual Report of the British Ministry of Pensions*, covering the period 1916-36,

⁷³ See Chap. xvi of the present volume. An excellent summary of the history of British War Pensioning is given in the Ministry of Pensions *Survey of War Pensions from 1916* published as Part II of the *19th Annual Report*, for 1936.

make possible comparisons for which the statistics available in Australia were insufficient to furnish a basis.

The broad results of assessment as shown at the present day by the pension lists of this and other countries may be illustrated as follows:

Comparative assessment

TABLE No. 62

Disablement Assessed at	United Kingdom		France	Germany	U.S.A.	Canada	Australia	New Zealand
	Number	Percentage of Total						
20% to 50%	324,100	75.5	64.2	74.0	74.3	72.2	68.3	74.8
60% and upwards ..	105,200	24.5	35.8	26.0	25.7	27.8	31.7	25.2

Intermediate grades of assessment vary rather more widely as between the several countries, being affected by local practice, such as the statutory fixing of certain grades for particular diseases as in the U.S.A. and Australia. But it is evident that the results of assessment on the common basis of physical disablement are fairly parallel in all countries.

The scale of cash compensation for disablement or death from war service is inevitably related in some degree to the cost of living and the current rates of wages. The following figures (Report *p.* 34) illustrate the relationship as it has been worked out in the United Kingdom and some other countries.⁷⁴

Pensions in relation to local wage rates and cost of living

TABLE No. 63

Country	100 per cent. Pension Standard or Flat Rate (per week)	Percentage of Pension to Average Weekly Wage	Purchasing Power of Pension in 1935 compared with Purchasing Power in 1920. (1920=100)
United Kingdom	40s.	73.9	174.5
Australia	42s.	49.7	128.1
Canada	\$17.3	62.3	155.0
New Zealand ..	40s.	48.1	135.4
France	123.3 Frs.	64.5	134.0
U.S.A.	\$23.0	62.2	146.7

⁷⁴ Based on particulars published by the International Labour Office, but (the Report states) in view of the known difficulties in the way of exact comparison they must be regarded as approximate only. For Germany comparative figures are not practicable, owing to extreme fluctuations in the value of currency in post-war years, and the enforced reductions in wages since 1932. As regards cost of living, the year 1920 has been taken as the basis of comparison, because by that year the basic 100 per cent. rate of pension for a private soldier had in most countries been fixed to allow for the increase in the cost of living.

"Every system recognises some lower limit of disablement below which continuing pension is not payable, but this lower limit is very variably placed. The British system places the minimum at 20 per cent. but freely recognises compensation for all disablements which cannot reach this assessment by temporary allowances for periods up to three years, or by lump sum gratuities. By contrast with the British system, Germany and Italy place the lower limit at 30 per cent., and Austria at 35 per cent., but all recognise compensation in the form of gratuity or temporary grant at lower degrees of disablement, coupled, however, with a condition of need. On the other hand France, Belgium and the United States place the minimum at 10 per cent., Australia, Canada and Newfoundland at 5 per cent., but recognise no intervening assessments, though they encourage compounding of the small rates. These various minima . . . make any comparison of the mere aggregate of the several pension lists almost valueless. The pension lists of some of these countries have therefore been classified below by degree of disablement, in so far as they are comparable."

TABLE NO. 64

DISABLEMENT PENSIONS

Percentage of Numbers at each rate of disablement from 20 per cent. to 100 per cent.

Rate of Disablement	United Kingdom	France	Germany	U.S.A	Belgium	Canada	Australia	New Zealand
%								
100	6.86	8.10	6.00	13.81	5.34	8.96	14.14	9.00
90	0.70	3.83	0.80	0.51	0.49	0.96	0.72	0.39
80	3.53	4.91	3.80	2.38	1.76	4.10	1.81	5.46
70	5.33	4.64	7.20	4.19	3.06	6.84	8.77	5.62
60	8.23	14.30	8.20	4.78	4.77	6.92	6.29	4.75
50	12.66	8.06	17.00	8.75	8.70	10.76	14.25	14.21
40	12.69	9.92	15.10	8.95	11.84	11.71	6.01	4.18
30	20.12	16.21	41.90	17.63	23.58	16.01	16.58	17.00
20	29.88	30.03	—	39.00	40.46	33.74	31.43	39.39

"Comparison of the gross expenditure on war pensions shows that, calculated in pounds sterling on the average rates of exchange current, from time to time the British Empire (United Kingdom and Dominions) has spent since 1914—£1,600,000,000. U.S.A. has spent since 1914 £1,050,000,000 and France £1,075,000,000.

"Corresponding figures for Germany are impossible of calculation on account of the violent fluctuation in the value of the mark before 1924. But if we take the expenditure for the past ten years in relation to population and to enlistments we find that the comparison produces the following results:

TABLE No. 65

	Population	Expenditure £ (millions)	Per 1,000 Enlistments £	Per 1,000 Population £
British Empire	65,000,000	750	98,684	11,538
France	41,500,000	477	58,743	11,494
Germany	66,000,000	680	52,037	10,303
U.S.A.	122,000,000	591	122,960	4,844

For Australia the corresponding figures would be:

Population	Expenditure £ (millions)	Per 1,000 Enlistments	Per 1,000 Population
6,806,752	75	£180,691	£11,051

This and Table 65 include dependants. The Report continues:

"The increasing lapse of time since the end of the war inevitably allows greater play to non-service factors, such as age, civil conditions, and the ailments common to humanity. . . . In the first place the majority of deaths occurring among the pensioners for some years after the war, were naturally those of the men who were severely disabled by wound, injury, or disease; and it is still the case that the proportion of deaths occurring among the 100 per cent. disability pensioners is the highest in any assessment grade. But as these cases are eliminated, the death rate in relation to the several age-groups of pensioners is gradually approximating to that of the mortality rate of the corresponding groups of the general male population. There is naturally enough still an excess mortality among disabled pensioners, but it is steadily being reduced. The position may be illustrated by the following figures:

TABLE No. 66

EXCESS MORTALITY OF PENSIONERS (OTHER RANKS)
BY AGE GROUPS

(Showing gradual approximation to general male death rate)

Age in 1930	Average Number of Pensioners In Year 1930-31	Excess Mortality Experienced by Men in Column (a) in the year				
		1930-31	1931-32	1932-33	1933-34	1935-36 (sic)
1	2	3 %	4 %	5 %	6 %	7 %
30-34	74,433	122	96	105	77	48
35-39	120,575	83	74	81	39	36
40-44	87,541	93	78	82	45	55
45-49	71,694	97	76	74	59	63
50-54	53,116	77	62	66	53	48
55-59	21,779	75	67	65	46	49
60-64	11,823	61	49	44	39	35
65-69	4,061	25	19	17	1	16

Note: The base period for general deaths is 1930-32.

As the absolute number of deaths of men pensioned remains fairly constant, the diminishing difference between the death rates of pensioners and of the general male population means that proportionately fewer pensioners are dying of their war disabilities and more of the accidents and ailments incidental to advancing age and civil life. This . . . is of course materially assisted by the elaborate medical treatment provided by the Ministry. . . . Even at this date 36 per cent. of claims are admitted to pension."

AUSTRALIAN PENSIONING STATISTICS AVAILABLE FROM THE
REPATRIATION COMMISSION'S ANNUAL REPORTS

The three next tables are from the reports of the Repatriation Commission or from data supplied by its Principal Medical Officer. The statistics of treatment are but slightly serviceable even as a general basis for the provision of treatment. No distinction, for example, is made in the record of "courses of treatment" between in-patients and out-patients.

TABLE No. 67

WAR PENSIONS—SUMMARY

Year ended 30th June	Pensions Granted	Claims Rejected	Pensions in Force				Amount paid in Pensions
			Incapacitated Members of the Forces	Dependants of Incapacitated Members	Dependants of Deceased Members	Total	
							£
1916 ..	9,054	1,732	3,025	1,415	4,314	8,754	137,920 ¹
1917 ..	38,360	5,438	15,916	11,264	18,011	45,191	1,212,632 ¹
1918 ..	71,939	11,163	40,702	32,154	37,318	110,174	2,772,077 ¹
1919 ..	82,938	12,644	71,512	59,581	50,436	181,529	4,828,072 ¹
1920 ..	60,661	5,617	90,389	86,448	48,743	225,580	5,872,770 ¹
1921 ..	25,983	3,388	79,491	93,995	49,051	222,537	7,386,842 ¹
1922 ..	17,560	2,064	76,249	102,046	47,077	225,372	7,028,377 ¹
1923 ..	16,529	2,005	74,692	111,828	45,635	232,155	7,134,967 ¹
1924 ..	14,166	1,733	72,760	120,188	43,813	236,761	7,090,815
1925 ..	15,258	1,964	72,128	129,702	42,767	244,597	7,146,864
1926 ..	14,826	1,878	72,128	139,477	41,004	252,609	7,347,246
1927 ..	13,323	2,518	72,388	147,568	39,865	259,821	7,558,559

¹ Includes payments made from Trust Fund, War Pensions Account, on behalf of other countries, less recoveries

TABLE No. 67—*Continued*

Year ended 30th June	Pensions Granted	Claims Rejected	Pensions in Force				Amount paid in Pensions
			Incapacitated Members of the Forces	Dependants of Incapacitated Members	Dependants of Deceased Members	Total	
1928 ..	13,547	1,826	72,667	155,809	38,194	266,670	7,690,890
1929 ..	12,857	1,044	73,436	163,013	36,182	272,631	7,734,921
1930 ..	13,650	1,257	74,578	170,437	34,270	279,285	7,919,476
1931 ...	11,555	920	75,316	172,389	35,617	283,322	7,996,180
1932 ..	5,592	776	75,646	166,846	31,619	274,111	7,440,188
1933 ..	2,693	664	75,244	164,268	30,298	269,810	6,925,830
1934 ..	2,792	609	75,037	162,198	29,719	266,954	7,048,592
1935 ..	4,174	Figures	74,998	158,787	30,276	264,061	7,360,057
1936 ..	5,510	not	76,337	153,736	30,062	260,135	7,520,228
1937 ..	5,098	since	77,076	145,308	29,422	251,806	7,683,089
1938 ..	19,993 ¹¹	pub-	77,315	151,337	28,562	257,214	7,761,207
1939 ..	6,794	lished	77,151	144,571	27,571	249,293	7,819,289
1940 ..	2,469		76,462	134,027	26,388	236,877	7,682,246 ¹¹¹

¹¹ Increase in 1938 due to change in the Act extending retrospectively the age to which children were eligible. The Financial Emergency Act came into force in 1931.

¹¹¹ The cost of treatment, 1918-40 was £9,671,295. From 30 June, 1924-30 June, 1942, 16,099 members of the 1st AIF have died while in receipt of pension.

SERVICE PENSIONS—SUMMARY

Year ended 30th June	Pensions Granted	Pensions in Force				Amount paid in Pensions
		Members of the Forces	Dependants of Members	Dependants of Deceased Members	Total	
1936	3,978	2,268	1,505	75	3,848	£ 31,136
1937	5,604	4,708	3,451	330	8,489	221,714
1938	3,641	6,061	4,252	538	10,851	329,871
1939	3,724	7,409	4,851	848	13,108	407,127
1940	2,788	8,187	4,684	1,129	14,000	472,263

The cost of administration in proportion to every £100 of Pensions paid between 1919 and 1934 varied from £1 16s. 3d. to £2 8s. 5d. (or in total from £140,128 to £180,610). The average fortnightly rate per pensioner was, in 1940, for incapacitated members of the forces £1 19s. 10d.; for each of their dependants 10s. 5d.; and for all pensioners (236,877) £1 4s. 5d.

TABLE No. 68

"CLASSIFICATION OF DISABILITIES OF AUSTRALIAN WAR PENSIONERS"

Year	Tuberculosis	Blind	Limbless	Mental under restraint	Eye, Ear, Throat	Heart	Diabetes	Gun Shot Wound other than above	Asthma, Bronchitis, and Pneumonia	War Neurosis	Malaria	Others—Rheumatism, Gout, Poisoning, Nephritis, etc.	Total	Number of Pensioners dying each year
1924	2,185	127	3,241	341	4,491	6,810	57	28,679	5,607	2,603	1,946	16,673	72,760	—
1925	2,193	129	3,229	347	4,493	6,658	56	28,421	5,564	2,543	1,850	16,645	72,128	714
1926	2,245	134	3,221	368	4,509	6,593	59	28,421	5,564	2,554	1,738	16,722	72,128	700
1927	2,675	130	3,204	387	4,534	6,361	58	28,305	5,829	2,583	1,690	16,432	72,388	734
1928	2,827	131	3,183	329	4,520	6,551	58	28,264	6,011	2,624	1,644	16,416	72,667	713
1929	2,902	130	3,164	426	4,562	6,550	58	28,350	6,860	2,727	1,617	16,090	73,436	702
1930	2,924	129	3,148	447	4,646	6,546	60	28,480	7,978	2,820	1,545	15,855	74,578	780
1931	2,807	131	3,119	455	4,683	6,548	62	28,600	8,358	2,908	1,450	16,135	75,316	763
1932	2,674	132	3,095	445	4,692	6,539	69	28,737	8,107	2,949	1,331	16,876	75,646	742
1933	2,585	134	3,259	499	4,710	6,506	73	28,675	8,079	2,951	1,135	16,638	75,244	751
1934	3,518	132	3,233	516	4,717	6,467	71	28,660	8,080	2,959	1,058	16,626	75,037	766
1935	2,484	136	3,213	522	4,750	6,414	72	28,599	8,122	3,014	1,015	16,657	74,998	870
1936	2,432	141	3,177	514	4,921	6,424	67	29,198	8,311	3,147	983	17,022	76,337	938
1937	2,403	140	3,155	522	5,036	6,417	66	29,511	8,376	3,240	943	17,267	77,076	1,007
1938	2,391	143	3,176	520	5,093	6,407	65	29,491	8,371	3,328	922	17,408	77,315	1,023
1939	2,385	147	3,166	519	5,109	6,347	63	29,441	8,376	3,345	887	17,366	77,151	1,087
1940	2,307	153	3,141	513	5,104	6,256	62	29,266	8,243	3,311	874	17,232	76,462	1,215

* Figures in this column supplied by the Principal Medical Officer. They do not include "Service Pensioners".

COURSES OF TREATMENT (IN-PATIENTS AND OUT-PATIENTS) BY THE
REPATRIATION COMMISSION

Year ended 30 June	Diabetes	Ear, Nose, Throat, Skin	Gas, including Lung	Gun Shot Wounds	Hearts in- cluding Functional and Organic	Kidneys, Chronic	Malaria and Bilharzia	Mentals	Pleurisy, Bronchitis, and Asthma	Rheumatism and Chronic	Trench Feet and Frost-bite	Tuberculosis	War Neurosis, including Epileptics, Neurasthenics, Alcoholics and Inebriates	Others	Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	
1922	20	2,408	627	5,115	849	441	719	444	1,863	717	57	2,651	1,885	3,636	21,432
1923	32	1,936	489	4,371	921	443	492	449	1,705	715	49	2,529	1,533	3,563	19,227
1924	41	1,494	526	3,966	1,042	637	488	455	2,005	859	63	2,369	1,414	2,943	18,362
1925	33	1,515	636	3,607	1,050	545	411	492	2,507	975	72	2,615	1,380	2,861	18,699
1926	44	2,088	729	4,059	1,236	610	522	584	3,109	1,116	66	2,878	1,570	4,128	22,742
1927	43	2,326	804	4,647	1,445	576	471	627	3,957	1,308	88	2,671	1,926	5,201	26,186
1928	57	2,343	754	4,885	1,665	465	449	674	4,707	1,550	107	2,575	1,971	4,470	26,672
1929	58	2,438	822	4,434	1,906	451	408	691	5,012	1,797	103	2,509	2,396	5,715	28,536
1930	57	2,644	762	4,599	1,616	473	422	789	4,654	2,025	100	2,710	2,192	5,851	29,098
1931	79	3,063	680	5,509	2,067	588	410	850	6,200	2,327	129	2,936	2,950	7,055	34,852
1932	98	2,856	663	5,584	2,143	561	348	816	5,977	2,261	130	2,886	3,136	6,666	34,119
1933	114	2,951	663	5,830	2,289	654	320	938	6,526	2,434	133	2,879	3,377	6,442	35,550
1934	79	2,891	658	6,379	2,464	720	268	771	6,700	2,666	129	2,808	3,440	6,650	36,653
1935	108	2,900	641	6,805	2,766	708	244	751	7,094	2,793	153	3,063	3,654	7,389	39,669
1936	98	3,303	631	7,721	3,116	722	269	809	8,678	3,143	188	3,819	4,016	8,731	45,235
1937	105	3,285	880	8,210	3,311	760	221	824	9,038	3,497	183	4,216	4,406	9,140	48,061
1938	101	3,530	663	8,208	3,491	754	212	824	9,075	3,650	176	4,269	4,578	8,922	48,453
1939	98	3,289	662	8,352	3,541	715	179	789	9,348	3,701	172	4,326	4,891	9,094	49,157
	1,265	47,260	12,290	102,281	36,918	10,823	6,853	12,562	98,905	37,564	2,101	54,703	50,715	108,457	582,697

TABLE No. 70

SERVICE PENSIONS

"Classification of Disabilities suffered by Members of the Forces
receiving Service Pensions as at 30th June, 1936-1940"

	1936	1937	1938	1939	1940
Wounds	11	42	58	77	75
Accidental injuries . .	21	53	73	99	107
New growths and cysts	18	32	43	50	51
Effects of gassing . .		2	2	3	3
Diseases due to infec- tions, spirochaetes (other than S.), and viruses	8	18	19	24	25
Pulmonary tubercul- osis	332	462	544	619	623
Protozoan and met- azoan disease	2	4	8	4	3
Venereal diseases . .	36	101	111	143	147
Skin diseases	1	3	7	5	6
Physical agents . . .		3	2	2	3
Intoxications of sys- tem	2	5	7	6	7
Endocrine glands, lymph glands, blood diseases	5	11	23	26	20
Metabolism and de- ficiency diseases . .	81	200	255	308	346
Alimentary system . .	22	70	98	119	131
Respiratory system . .	63	175	240	276	328
Genito-urinary sys- tem	25	66	74	79	84
Vascular system . . .	163	500	695	851	952
Nervous system (ex- cluding disease due to S. or Vascular Degeneration)	32	73	103	120	117
Neurosis, psycho- neurosis and men- tal disorders	79	344	499	694	745
Vasomotor, trophic disease, Raynaud's, erythromelalgia . . .	1	3	3	2	2
Muscles, faciae, joints, bones	87	212	296	378	406
Eyes	17	55	68	85	88
Ears	4	18	25	34	36
Unclassified	1		3	8	24
Old Age	1,257	2,256	2,805	3,397	3,858
	2,268	4,708	6,061	7,409	8,187

Enquiry into the data available for a statistical epitome of the pension experience of the A.I.F. revealed the fact that the record system of the Repatriation Department provided only for a partial analysis of the diseases and disorders whose attribution to or "material aggravation" by service creates the pension problem. To remedy this, the co-operation of the Repatriation Commission was sought and was most cordially given. The Commission arranged that from all the personal record cards (known as "K" Cards) that were handled during the year, information concerning the nature of the disease or diseases entitling the soldier to treatment and pension, and the assessment of the degree of disability caused by each, should be entered on special cards to the total number of 30,000 and sent to the medical historian. The special cards were duly furnished and covered roughly the year 1931-2. The enquiry involved much labour and some expense, for which the Commission very kindly made provision. The number of *cards* in which disease was a ground for entitlement was 20,631; the *total number* of soldiers receiving a pension for disease was approximately 51,577. The conclusions drawn were thus based on the experience of two-fifths of the men so pensioned.

In tabulating the information every entry for disease was counted whether the disease was unique or combined with a wound or other disease; the incidence of disease was then classified in accordance with the principle adopted in the companion tables.⁷⁵

The inquiry was undertaken in order to bring into line the post-war experience of *pensioning* with the *intra-war experience of the A.I.F.*, and identify, from the point of view of the public purse, the conditions of ill-health most likely to lead to pension claims—whether these causes might lie in the imperfect selection of recruits; or in a too imperfectly fulfilled need of treatment, immediate, consequential, or "reparative". It has to be acknowledged that neither the method of "sampling" the Australian pensions experience, nor the nature of the sample obtained can furnish evidence on which to base absolute judgment. The experience of one year, and that one late in the

⁷⁵ This work was carried out by A. J. Withers.

experience, can at best give a partial picture of the clinical problem of pensioning. As demonstrated in the British figures, many causes of pensioning petered out during earlier years; while on the other hand, such common attributions as hyperpiesia, arterio-sclerosis, pulmonary fibrosis, rheumatism, *et hoc genus omne*, are seen then as almost a microscopic section of the *corpus* of pensions experience. But study of the figures yet reveals certain interesting, even startling clinical features, and gives a broader picture than can be gained from those published. At least the table supplies a morbidity table of a sample of the Australian population not available from civil experience.

The outstanding fact of war pensions experience is that only in a comparatively small proportion of pension cases was the pension ground unique. On an average each pensioner received a pension for 1.46 causes of disablement.⁷⁶ Unfortunately for statistical study the "K" Card gives no indication of the relative place of the several disabilities, either as to priority of acceptance or as to their relative importance in pensioning. Two sets of pensions present themselves—(a) those with single, (b) those with multiple grounds for pensions. Thus we have to deal with three factors in the problem of attribution (1) with men; (2) with "diseases" (or injuries); (3) with the singularity or multiplicity of these.

In the following table every disability listed in the "K" Cards as entering into an accepted pension claim for the year 1931 is classified into one or another "group" in accordance with the nosological scheme adopted in this history, and the result is augmented so as to relate the total number of disabilities counted to the total number of men pensioned for non-battle casualty. These men might be pensioned either because of a unique cause (except wounding) or for a multiple cause (part of which might be wounding), but they do not include those whose pension was for wounds alone. In the calculations on which the following table is based the items in multiple claims have been counted separately, and in this way we arrive at a reasonably correct estimate, for the year in question, of the numerical incidence of each disease group in the pension picture. But the table does *not* indicate the relative financial cost

⁷⁶ See footnote p 980

to the nation of each disease and disorder as a cause of pensioning. The records of the Australian Department do not permit of such an investigation since the multiple entries of disablement do not indicate what amount of pension was granted in respect of each item—which, of course, varies.

TABLE NO. 71

SUMMARY OF AUSTRALIAN WAR PENSIONS, IN 1931

	Pension	Actual Count of Cards	Total	Numbers Pensioned ("Estimated" Figures)	Actual number of Pensioned Men
Non-Battle Casualties ..	30 per cent. and under	9,167		23,284	
	30 per cent. to 70 per cent.	4,506		11,445	
	Over 70 per cent.	3,259		8,278	
<i>Total Non- Battle Cas- ualties ..</i>			16,932		43,007
Wounds	30 per cent. and under	4,197		10,660	
	30 per cent. to 70 per cent.	3,086		7,838	
	Over 70 per cent.	1,700		4,318	
<i>Total wounds</i>			8,983		22,816
Wounds and disease ..	30 per cent. and under	1,468		3,729	
	30 per cent. to 70 per cent.	1,185		3,010	
	Over 70 per cent.	1,046		2,657	
<i>Total—Wounds and disease</i>			3,699		9,396
			29,614		75,219
(Short of actual pensions figure) ¹					97
					75,316

¹ The Repatriation Commission's Report for 1931 gives the number of ex-members of the Forces receiving pensions as 75,316; made up as follows—Non-battle casualties, 43,466; battle (wounds and wounds plus disease)—31,850.

TABLE No. 72

CAUSES (OTHER THAN BATTLE CASUALTIES) FOR WHICH, IN 1931, AUSTRALIAN PENSIONS HAD BEEN RECEIVED IN RESPECT OF THE WAR OF 1914-1918

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
I.	I	I	Overage	13	0.25
"	"	3	Senility	275	5.33
"	2	7	Varicocele	54	1.04
"	"	8	Astigmatism	5	0.10
"	"	"	Myopia	10	0.19
"	"	"	Vision defective	633	12.24
"	"	9	Callosities	15	0.29
"	"	"	Corns	5	0.10
"	"	"	Deformed feet	43	0.83
"	"	"	Dupuytren's contraction	15	0.29
"	"	"	Flat feet	130	2.52
"	"	"	Hallux rigidus	5	0.10
"	"	"	Hallux valgus	33	0.64
"	"	"	Hammer toes	5	0.10
"	"	"	Ingrowing toe nail	2	0.04
"	"	"	Pes planus	3	0.06
"	"	11	Nasal septum	18	0.35
"	"	14	Hernia	885	17.15
"	"	15	Varicose veins	472	9.15
"	3	16	Miner's phthisis	2	0.04
"	4	19	Dental sepsis	5	0.10
"	"	"	Dental caries	3	0.06
II.	5	20	Burns	15	0.29
"	"	"	Cerebral concussion	10	0.19
"	"	"	Concussion	117	2.25
"	"	"	Contusion	23	0.45
"	"	"	Dislocation	89	1.73
"	"	"	Displaced cartilage	2	0.04
"	"	"	Fractures	462	8.95
"	"	"	Injury	1,134	21.98
"	"	"	Injury, body	250	4.84
"	"	"	Injury, knee	469	9.09
"	"	"	Injury, head—including eye	112	2.13
"	"	"	Injury, upper extremities	296	5.74
"	"	"	Injury, lower extremities	209	4.05
"	"	"	Pott's fracture	2	0.04
"	"	"	Sinovitis	566	10.91
"	"	"	Scald	3	0.06
"	"	"	Sprain	15	0.29

TABLE No. 72—Continued

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
II.	5	20	Trauma	3	0·06
"	"	"	Weak ankle	2	0·04
III.	6	21	Enteric	151	2·93
"	"	"	Paratyphoid	13	0·25
"	"	"	Post-enteric	2	0·04
"	"	22	Dysentery	752	14·57
"	"	27	Amoebic dysentery	3	0·06
"	"	"	Liver abscess	15	0·29
"	7	28	Diphtheria	20	0·39
"	"	30	Scarlet fever	10	0·19
"	"	31	Cerebro-spinal fever	309	5·99
"	"	32	Pneumonia	219	4·24
"	"	33	Broncho-pneumonia	48	0·93
"	"	34	Pleurisy	573	11·10
"	"	"	Pyo-pneumothorax	2	0·04
"	"	35	Bronchial catarrh	212	4·11
"	"	"	Tracheitis	3	0·06
"	"	37	Influenza	145	2·81
"	"	"	Nasal catarrh	23	0·44
"	"	"	Naso-pharyngitis	64	1·24
"	"	"	Respiratory tract infection	16	0·31
"	"	"	Rhinitis	79	1·53
"	"	"	Tonsillitis	92	1·78
"	"	"	Throat trouble	15	0·29
"	"	39	Post-measles	2	0·04
"	"	40	Post-mumps	8	0·15
"	8	41	Post vaccinia	105	2·03
"	"	43	Encephalitis lethargica	10	0·19
"	9	46	Pericarditis	3	0·06
"	"	"	Rheumatic fever	82	1·59
"	"	47	Rheumatic carditis	20	0·39
"	"	"	Rheumatic endocarditis	10	0·19
"	10	48	Haemoptosis	13	0·25
"	"	"	"Phthisis"	46	0·89
"	"	"	T.B. (Pulmonary Tuberculosis)	3,616	70·08
"	"	49	Pott's disease	13	0·25
"	"	"	Tuberculosis—other	161	3·12
"	11	50	Tropic ulcer	3	0·06
"	12	53	Pharyngitis	214	4·13
"	"	"	Quinsey	3	0·06
"	"	"	Stomatitis	2	0·04
"	13	55	Osteomyelitis	20	0·39
"	"	"	Poliomyelitis	3	0·06
"	"	"	Pyæmia	2	0·04

TABLE NO. 72—Continued

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
III.	13	55	Septicaemia	3	0.06
"	"	"	Sepsis	2	0.04
"	"	56	Abscess	26	0.50
"	"	"	Furunculosis	36	0.70
"	"	"	Lymphadenitis	3	0.06
"	"	"	Lymphangitis	2	0.04
"	"	"	Mediastinitis	3	0.06
"	"	"	Pelvic abscess	5	0.10
"	"	"	Perineal abscess	2	0.04
"	"	"	Perinephric abscess	3	0.06
"	"	"	Periostitis	15	0.29
"	"	"	Quinine abscess	2	0.04
"	"	"	Thoracic abscess	5	0.10
"	"	57	Cellulitis	23	0.45
"	"	"	I.C.T.	5	0.10
"	"	"	Ulceration	20	0.39
"	14	58	Cerebral syphilis	5	0.10
"	"	"	Cerebro-spinal syphilis	3	0.06
"	"	"	Syphilis	38	0.74
"	"	59	Urethritis	5	0.10
"	"	61	Bacilluria	2	0.04
"	"	"	Epididymitis	28	0.54
"	"	"	Papillomata ani	3	0.06
"	"	"	Specific infection	2	0.04
"	"	"	V.D.	5	0.10
"	15	62	Blackwater fever	3	0.06
"	"	"	Malaria	1,647	31.92
"	"	63	Filariasis	10	0.19
"	"	64	Trench fever	918	17.79
"	"	66	Relapsing fever	5	0.10
"	"	68	Bilharziasis	56	1.09
"	"	69	Hydatid	18	0.35
"	16	76	Tinea	5	0.10
IV.	20	81	Heatstroke	2	0.04
"	"	83	Frostbite	59	1.14
"	"	"	Trench feet	699	13.55
"	21	86	Rheumatism	3,774	73.14
"	"	87	Rheumatoid arthritis	268	5.19
"	"	88	Fibrositis	148	2.87
"	"	"	Pleurodynia	3	0.06
"	"	"	Rheumatic fibrositis	10	0.19
"	"	"	Rheumatic myalgia	2	0.04
"	"	"	Rheumatic neuritis	5	0.10
"	"	92	Osteoporosis	3	0.06
"	23	94	Hyperthyroidism	56	1.09

TABLE No. 72—Continued

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
V.	25	98	Insomnia	10	0·19
"	"	99	Shell-shock	829	16·07
"	"	"	Shell concussion	110	2·13
"	"	100	Aphonia	20	0·39
"	"	"	Hysteria	54	1·05
"	"	101	Neurasthenia	5,138	99·55
"	"	"	Psychasthenia	20	0·39
"	"	102	Mucous colitis	5	0·10
"	"	"	Neurosis	854	16·74
"	"	"	Neurosis anxiety	41	0·79
"	"	"	Neurosis cardiac	48	0·93
"	"	"	Neurotic condition	5	0·10
"	"	"	Nervous condition	43	0·83
"	"	"	Nervous dyspepsia	2	0·04
"	"	"	Psycho-neurosis	26	0·50
"	"	"	Stammering	20	0·39
"	"	"	Weakness	5	0·10
"	26	103	Encephalitic neurasthenia	3	0·06
"	"	"	Nervous debility	207	4·01
"	"	"	Effort syndrome (including D.A.H.)	4,567	88·51
"	"	"	Palpitation	2	0·04
"	"	"	Paroxysmal tachycardia	3	0·06
"	"	"	Tachycardia	388	7·52
"	27	104	Alcoholism	8	0·15
"	28	108	Confusional states	46	0·89
"	"	109	Melancholia	38	0·74
"	"	111	Paraphrenia	2	0·04
"	"	"	Schizophrenia	3	0·06
"	"	115	"Dementia"	5	0·10
"	"	"	"Insanity"	609	11·80
"	"	"	"Mental"	367	7·11
VI.	29	116	Goitre	38	0·74
"	"	"	Myxoedema	2	0·04
"	"	"	Thyroid enlargement	3	0·06
"	"	"	Thyrotoxicosis	5	0·10
"	"	117	Addison's disease	5	0·10
"	"	118	Adiposity	2	0·04
"	"	"	Hypopituitarism	3	0·06
"	30	120	Diabetes	61	1·18
"	"	"	Diabetes mellitus	18	0·35
"	"	"	Glycosuria	26	0·50
"	31	121	Hodgkin's disease	5	0·10
"	"	"	Rodent ulcer	5	0·10
"	"	"	Sarcoma	5	0·10

TABLE No. 72—Continued

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
VI.	31	121	Sarcocele	2	0·04
"	"	"	Tumour	5	0·10
"	"	122	Fibroid	3	0·06
"	"	"	Lipoma	2	0·04
"	"	"	Leucaemia	3	0·06
"	"	"	Neurofibromata	2	0·04
"	"	"	Osteoma, skull	5	0·10
"	"	"	Ossification, thigh	3	0·06
"	"	"	Paget's disease	3	0·06
"	32	123	Gout	5	0·10
"	"	125	Asthma	949	18·39
"	"	"	Asthma, bronchial	112	2·15
"	"	127	Sclerodactylia	5	0·10
VII.	33	128	Aphasia	5	0·10
"	"	"	Cerebral congestion	3	0·06
"	"	"	Cerebral haemorrhage	8	0·15
"	"	"	Cerebral embolism	2	0·04
"	"	"	Hemiparesis	8	0·15
"	"	"	Hemiplegia	36	0·70
"	"	"	Paraplegia	54	1·05
"	"	"	Paralysis	26	0·50
"	"	129	Sclerosis	38	0·74
"	"	130	Epilepsy	339	6·57
"	"	"	Encephalitic Parkinsonism	8	0·15
"	"	"	Fits	38	0·74
"	"	"	Giddiness	5	0·10
"	"	"	Huntington's chorea	5	0·10
"	"	"	Migraine	23	0·45
"	"	"	Parkinson's disease	15	0·29
"	"	"	Petit mal	13	0·25
"	"	131	Cephalalgia	3	0·06
"	"	"	Headache	59	1·14
"	"	"	Vertigo	8	0·15
"	"	132	Myelitis	20	0·39
"	"	"	Tabes dorsalis	28	0·54
"	"	"	Tabo paresis	5	0·10
"	"	133	Bell's paralysis	28	0·54
"	"	"	Neuralgia	26	0·50
"	"	"	Neuritis	156	3·02
"	"	"	Paralysis of legs	2	0·04
"	"	"	Sciatica	344	6·67
"	"	"	Tic douloureux	3	0·06
"	"	134	Raynaud's disease	5	0·10
"	34	136	Blepharitis	41	0·79
"	"	"	Conjunctivitis	375	7·27

TABLE No. 72—Continued

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
VII.	34	136	Corneal nebula	2	0.04
"	"	"	Corneal ulcer	97	1.88
"	"	"	Epiphora	10	0.19
"	"	"	Lacrymal sac infection	2	0.04
"	"	"	Pterygium	13	0.25
"	"	"	Ptosis	5	0.10
"	"	"	Trachoma	133	2.58
"	"	137	Cataract	41	0.79
"	"	"	Choroiditis	18	0.35
"	"	"	Cyclitis	8	0.15
"	"	"	Diplopia	5	0.10
"	"	"	Glaucoma	5	0.10
"	"	"	Irido-cyclitis	3	0.06
"	"	"	Iritis	28	0.54
"	"	"	Keratitis	31	0.60
"	"	"	Leucoma	2	0.04
"	"	"	Optic atrophy	5	0.10
"	"	"	Retinitis	8	0.15
"	"	138	"Eyesight"	5	0.10
"	"	"	"Eye trouble"	105	2.03
"	"	"	Ocular condition	26	0.50
"	"	139	"Aural trouble"	20	0.39
"	"	"	"Deafness"	1,568	30.39
"	"	"	"Hearing"	727	14.09
"	"	140	"Ear trouble"	115	2.23
"	"	"	Labyrinthitis	5	0.10
"	"	"	Mastoid	28	0.54
"	"	"	Mastoiditis	48	0.93
"	"	"	Nerve deafness	2	0.04
"	"	"	Otitis media	1,111	21.53
"	"	"	Otorrhoea	20	0.39
"	"	"	Otosclerosis	26	0.50
"	"	"	Tinnitus	15	0.29
"	"	141	Antrum, disease of	51	0.99
"	"	"	Adenoids	3	0.06
"	"	"	Nasal trouble	168	3.24
"	"	"	Sinusitis	183	3.55
"	35	142	Psoriasis	48	0.93
"	"	144	Acne vulgaris	18	0.35
"	"	"	Alopecia	10	0.19
"	"	"	Seborrhoea	2	0.04
"	"	145	Dermatitis	171	3.31
"	"	"	Eczema	150	2.91
"	"	"	Erythema	8	0.15
"	"	"	Lichen planus	3	0.06
"	"	"	Lupus erythematosus	5	0.10
"	"	"	Pityriasis	2	0.04

TABLE No. 72—Continued

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
VII.	35	145	Skin trouble	20	0.39
"	"	"	Urticaria	10	0.19
"	36	146	Dysphagia	3	0.06
"	"	147	Achlorhydria	2	0.04
"	"	"	Dyspepsia	311	6.03
"	"	"	Gastralgia	3	0.06
"	"	"	Gastritis	701	13.59
"	"	"	Gastric condition	66	1.28
"	"	"	Gastric catarrh	8	0.15
"	"	"	Gastric neurosis	41	0.79
"	"	"	Gastric ulcer	170	3.47
"	"	"	Indigestion	18	0.35
"	"	"	Nervous dyspepsia	20	0.39
"	"	"	Stomach trouble	112	2.15
"	"	148	Duodenal ulcer	405	7.85
"	"	"	Gastric	179	3.47
"	"	"	Gastro-enterostomy	20	0.39
"	"	"	Gastro-hyperacidity	5	0.10
"	"	"	Haematemesis	2	0.04
"	"	"	Hyperchlorydia	10	0.19
"	"	"	Peptic ulcer	5	0.10
"	"	"	Pyloric ulcer	10	0.19
"	"	"	Stomach ulceration	3	0.06
"	"	149	Atonic disturbance	2	0.04
"	"	"	Atonic stomach	3	0.06
"	"	"	Visceroptosis	46	0.89
"	"	150	Appendicitis	171	3.31
"	"	"	Pericaecal adhesions	2	0.04
"	"	"	Peritonitis	13	0.25
"	"	"	Post-appendectomy	74	1.43
"	"	151	Colitis	272	5.27
"	"	"	Colonic stasis	5	0.10
"	"	"	Diarrhoea	181	3.51
"	"	"	Enteritis	56	1.09
"	"	"	Gastro-enteritis	26	0.50
"	"	"	Ileal stasis	8	0.15
"	"	"	Intestinal stasis	3	0.06
"	"	"	Ptoxis	13	0.25
"	"	152	Fistula	41	0.79
"	"	"	Fistula ani	15	0.29
"	"	"	Haemorrhoids	433	8.39
"	"	"	Prolapse ani	28	0.54
"	"	"	Pruritis ani	2	0.04
"	"	"	Rectal abscess	10	0.19
"	"	"	Rectal sinus	3	0.06
"	"	"	Rectal trouble	31	0.60
"	"	153	Constipation	59	1.14

TABLE No. 72—Continued

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
VII.	36	154	Abdominal condition ..	530	10.27
"	"	"	Abdominal trouble ..	112	2.15
"	"	"	Abdominal adhesions ..	48	0.93
"	"	"	Bowel haemorrhage ..	2	0.04
"	"	"	Bowel trouble ..	3	0.06
"	"	"	Coloptosis ..	20	0.39
"	"	"	Gangrenous caecum ..	2	0.04
"	"	"	Melaena ..	3	0.06
"	"	"	Neurosis, gastric ..	18	0.35
"	"	155	Cholecystitis ..	77	1.49
"	"	"	Cholelithiasis ..	15	0.29
"	"	"	Gall stones ..	23	0.45
"	"	"	Jaundice ..	28	0.54
"	"	156	Hepatitis ..	5	0.10
"	"	"	Hepatic abscess ..	18	0.35
"	"	"	Liver trouble ..	5	0.10
"	37	157	Laryngitis ..	171	3.31
"	"	158	Bronchiectasis ..	66	1.28
"	"	"	Bronchitis ..	5,885	114.05
"	"	"	Fibrosis of lungs ..	5,936	115.04
"	"	159	Emphysema ..	403	7.81
"	"	"	Lung collapse ..	2	0.04
"	"	160	Chest trouble and condition ..	581	11.28
"	"	"	Empyema ..	158	3.06
"	"	"	Haemothorax ..	8	0.15
"	"	"	Lung abscess ..	2	0.04
"	"	"	Lung condition ..	8	0.15
"	"	"	Pleural adhesions ..	8	0.15
"	"	"	Pulmonary condition ..	77	1.49
"	"	"	Respiratory condition ..	5	0.10
"	38	161	Aortic disease of heart ..	46	0.89
"	"	"	Cardiac condition ..	100	1.94
"	"	"	Cardiac disease ..	3	0.06
"	"	"	Cardiac trouble ..	199	3.86
"	"	"	Cardiac insufficiency ..	2	0.04
"	"	"	Cardio-vascular changes ..	95	1.84
"	"	"	Cardio-vascular degeneration ..	8	0.15
"	"	"	Endocarditis ..	31	0.60
"	"	"	Mitral stenosis ..	48	0.93
"	"	"	Mitral regurgitation ..	33	0.64
"	"	"	Morbus cordis ..	5	0.10
"	"	"	Syncopal attacks ..	3	0.06
"	"	"	V.D.H. ..	686	13.29
"	"	162	Angina pectoris ..	15	0.29

TABLE No. 72—*Continued*

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease
VII.	38	162	Heart—		
"	"	"	Arrythemia	13	0.25
"	"	"	Auricular fibrillation	10	0.19
"	"	"	Cardiac condition ..	97	1.88
"	"	"	Cardiac debility ..	5	0.10
"	"	"	Cardiac dilatation ..	99	1.92
"	"	"	"Cardiac trouble" ..	191	3.70
"	"	163	Cardiac neurosis	10	0.19
"	"	"	Heart trouble	1,448	28.09
"	"	"	Myocarditis	423	8.20
"	"	164	Aneurism	28	0.54
"	"	"	Arterio-sclerosis	196	3.80
"	"	"	Arterio-venous	3	0.06
"	"	"	Angio-neurotic oedema	10	0.19
"	"	"	Atheroma	5	0.10
"	"	"	Hyperpiesis	81	1.57
"	"	165	Phlebitis	41	0.79
"	"	39 166	Spleen enlarged	2	0.04
"	"	167	Anaemia	148	2.87
"	"	168	Adenitis	10	0.19
"	40	169	Kidney trouble	51	0.99
"	"	"	Nephritis	1,071	20.76
"	"	"	Renal cirrhosis	2	0.04
"	"	170	Calculus renal	99	1.92
"	"	"	Haematuria	15	0.29
"	"	"	Nephrectomy	10	0.19
"	"	"	Pyelitis	66	1.28
"	"	"	Renal trouble	15	0.29
"	"	171	Cystitis	166	3.22
"	"	"	Dysuria	28	0.54
"	"	"	Prostatitis	2	0.04
"	"	172	Stricture	38	0.74
"	41	173	Atrophy testicles	61	1.18
"	"	"	Hydrocele	41	0.79
"	"	"	Orchitis	28	0.54
"	"	"	Testicles	8	0.15
"	42	174	Atrophy muscles	41	0.79
"	"	"	Backache	5	0.10
"	"	"	Bursitis	10	0.19
"	"	"	Lumbago	196	3.78
"	"	"	Myalgia	456	8.84
"	"	"	Torticollis	2	0.04
"	"	175	Ankylosis	81	1.57
"	"	"	Arthritis	393	7.62
"	"	"	Bunions	28	0.54
"	"	"	Internal derangement of knee joint	13	0.25

TABLE No. 72—Continued

Type	Class	Group	Nature of Disability as Stated on Card	Number of Occasions Cited as Cause of Pensioning	Rate o/oo Men Pensioned for Disease	
VII.	42	175	Osteitis	31	0.60	
"	"	176	Hip disease	8	0.15	
"	"	"	Hip trouble	15	0.29	
"	"	"	Hydrarthrosis	2	0.04	
"	"	"	Kyphosis	15	0.29	
"	"	"	Osteo-arthritis	513	9.94	
"	"	"	Perthes's disease	2	0.04	
"	"	"	Scoliosis	13	0.25	
"	"	"	Spinal curvature	2	0.04	
"	"	"	Spinal trouble	74	1.43	
"	"	"	Spondylitis	510	9.88	
"	43	177	Colloid degeneration	3	0.06	
"	"	"	Debility	2,374	46.00	
VIII.	44	178	Miscellaneous diseases	8	0.15	
"	"	"	Oedema	18	0.35	
"	"	"	Pyrexia	5	0.10	
"	"	179	Hypertrophy	15	0.29	
"	"	"	Hyperasthenia	5	0.10	
"	"	"	Neck	26	0.50	
"	"	"	Onychognyposis	2	0.04	
"	"	"	Perisplenitis	3	0.06	
"	"	"	Stenosis	2	0.04	
"	"	"	Paresis	69	1.34	
"	"	180	Menorrhagia	3	0.06	
"	"	"	Prolapsus uteri	2	0.04	
"	"	"	Uterine fibromata	2	0.04	
				71,589*		
				Blind, totally	97	1.88
				Blind, one eye	133	2.58
				Gas	3,542	68.64
				Gas fibrosis	5	0.10
				Total	75,366*	

* 75,366 causes of pensioning occurred in the 51,577 men pensioned (1931) for reasons other than wounds, equalling 1.46 per man.

Excluding "gas" and "blind" cases, there were 71,589 "non-battle" causes of pensioning in 50,728 men—1.41 per man.

CHAPTER XVIII

QUO VADIMUS?

IN the second volume of this work the writer defined what he called the triple mandate of the Army Medical Service:

To the military command it owed service to promote and conserve man-power for the purpose of war. To the nation at large, it was responsible for promoting, by intelligent anticipation, the efforts of the civil institutions whose duty it should be to prepare for useful return to civil life the soldiers unfitted for further military service. By humanity, as represented by the nations who subscribed to the International Conventions of Geneva and The Hague, it was charged with minimising so far as possible the individual sufferings of the combatants of both sides. These three strands of purpose, inextricably interwoven as they were, in a self-contained and consistent scheme of medical service, nevertheless furnished each an end in itself—all three entering at every stage into the medical problem, and now one, now another, providing its dominating motive.¹

The integration of these three spheres of social purpose in a triple mandate placed upon an accredited medical service took some four thousand years fully to accomplish. In the world war of 1914-18 this military triple alliance came to maturity in a highly complex social group, the Army Medical Service; at once a technical military service, exactly organised, established, and trained for maintaining the army's strength for the achievement of victory; a scientifically equipped social service co-operating with the various civil agencies in effecting the repair and re-enablement of the war-damaged soldier; and a fully accredited humane agency for promoting and co-operating in the alleviation of suffering.

This work has dealt at length with the discharge of the first two mandates. It closes with an endeavour to illuminate from Australian experience the extent to which the third mandate was fulfilled in the First World War.

¹ *Official History of the Australian Army Medical Services, Vol. II, p. 263.*

Speaking of the Hague Convention the British Medical Historian deplores the fact that

One by one in the course of the war the Regulations were broken until not one was left.

The same was sometimes loosely and thoughtlessly said of the Geneva Conventions.² Thus even Martin Gumpert, in *Dunant: The Story of the Red Cross*, says:

Four years of war destroyed the constructive work of centuries—what had seemed to be the almost inevitable advance of the spiritual and material unity of the world. There was not much humanitarianism to be seen on the battle-fields, private life and property were not spared, treaties were not respected, destructive weapons were not restricted. And the Red Cross . . . stood powerless before the moral dissolution. Humanitarianism was the unknown soldier, over whose mouldering limbs the eternal fire of remorse now burns.

It is true that such repudiation of the humane conventions and pledges would have been in line with the philosophy that was powerful then in Germany (and is even more powerful to-day). Certainly many ruthless spirits on both sides would have liked to ordain it. But even in Germany the plain people—and even the officer class—were insufficiently indoctrinated with that philosophy to permit of its being logically and ruthlessly followed. Australian experience, indeed, shows that the Geneva Convention was observed to an extent far greater than the propaganda of either side admitted.³

² *The Geneva Conventions*. The First International Conference, resulting in an agreement for "the Amelioration of the Condition of the Wounded and Sick in Armies in the Field" was held in 1864, the "Convention" being signed on the 22nd August. At a second conference, in 1868, fourteen additional articles were drawn up but did not become operative. The 1864 Convention was replaced by that of 6 July 1906 which was subsequently considered in the *Hague Peace Conference* of 1907 and was adopted as Convention X thereof.

The Hague Peace Conferences—Elimination of inhumane weapons. On the initiative of Czar Nicholas of Russia, culminating from proposals reaching back to the Abbe de St. Pierre (1713), Jeremy Bentham (1789), and Immanuel Kant (1795), conferences were held in 1899 and 1907 at The Hague in Holland. With the main object of these, the elimination or reduction of war and its replacement by arbitration, the Army Medical Service is not directly concerned, but the elimination of certain weapons and instruments associated with the major horrors of war, with which the conferences also dealt, does directly concern it. "The use of toxic substances" including gases, of "arms, etc., of a nature to cause unnecessary suffering", of expanding bullets, and of the "launching of projectiles and explosives from balloons" after discussion at both conferences was finally ruled out by an agreement to which most civilised nations were parties.

³ The episode of the outbreaks of typhus in certain prisoners-of-war camps in Germany, has, however, an evil eminence. In 1916 a committee was appointed in Great Britain to investigate the matter, and based its report chiefly on the evidence of the British medical officers interned there. Briefly, the facts were found to be as follows:

In the Wittenburg camp were 15,000 prisoners of whom some 800 were British. The camp was shockingly over-crowded and though at this stage of the war, there

Usage in Connection with Enemy Wounded. The central feature of the Geneva Mandate is the acceptance of an attitude toward the wounded man independent of any other consideration than the urgency of his need. It is not proposed to attempt the unpopular task of white-washing the enemy and blackening ourselves. This, as it happens, would be as incorrect as it would certainly be unpopular.

But study of Australian experience, as well as of every type of current literature bearing on the subject over a period of twenty years, has led the present writer to conclude that in this matter of the treatment of enemy wounded as between ourselves and the enemy from the point of view of humanity there was "nothing in it" one way or the other.⁴ Speaking broadly both sides gave preference "other things being equal" to their own men; and it must be acknowledged that in the matter of apparently hopeless cases the benefit of the doubt was sometimes less generously afforded to the enemy than to our own. But with few exceptions (such as occurred under stress of bitter anger at real or supposed treachery) the enemy wounded were treated

was no shortage "the food supply was grossly insufficient", and "means for washing the personal underclothing scarcely existed". "The prisoners slept three to a straw mattress or on the floor."

Typhus was introduced by the Russian prisoners of war. The German medical officer and attendants "at once fled, and the camp was cut off from the outside world". Six medical officers of the R.A.M.C. from outside camps were sent to Wittenburg, they had not been told that typhus was prevalent. The German authorities refused to permit isolation of cases to one part of the camp, and required that typhus and other patients should be mixed. On March 7 there were, at one time, 1,000 cases of typhus, and fresh cases were occurring at the rate of 50 a day. The degree of louse-infestation, as described by these fully reputable officers, almost exceeds belief.

"The British sick were scattered among the Allied prisoners, some on the ground, others on straw mattresses. There were no bed-pans, and the state of some of the mattresses was indescribable." On these delirious men tossed, "unwashed, untended, and in a frightful state of uncleanness". There were no changes of clothing and no soap was provided.

In the Gardelegen camp an outbreak occurred among some 11,000 prisoners, of whom 6,000 were French and 230 British and the rest Russian. One of the British medical officers recorded that "the overcrowding was such as he had never before seen or even imagined. . . . The men were moreover half-starved." 2,000 cases of typhus fever occurred in this camp. Of 16 medical officers British and other in this camp 12 were infected and two died. In this camp (it is with pride and pleasure that one can record) the German doctor had remained at the hospital until he contracted the disease, and died.

The experience of the Australian Red Cross, and records from Australian prisoners of war make it clear that much depended on the character of the commandant. In some German camps treatment and conditions were not inferior to those which obtained (so far as can be ascertained) universally in Britain and certainly in Australian internment camps.

⁴ The *Australian Official History* contains (under the indexed headings, "Red Cross", and "Red Cross Flag") a mine of exact and dispassionate information on this aspect of warfare on the Western Front.

with a consideration no less punctilious and humane than we expected and received from him.⁵

The subsequent treatment of our wounded as prisoners of war belongs elsewhere. On our side, when once he reached a C.C.S. the one thing that counted was the need of the case.

The Collection of Wounded in the Field. From the point of view of the Geneva Convention the outstanding feature of the discharge of this function throughout the war is unquestionably the fact that, save under stress of special circumstance, or resentment—spontaneous or propaganda-generated—for supposed transgression, we were not as a rule interfered with in the collection of wounded in the field. Instances are given in the text of the first two volumes where stretcher-bearers were unnecessarily fired on and otherwise hampered in their duty; but, speaking broadly, so long as it could be achieved without any danger to the tactical position, each side allowed the wounded to be collected, expecting similar treatment from the other side. The chief menace in this practice was its occasional abuse by unscrupulous or insufficiently educated leaders on both sides. The Germans sometimes carried machine-guns forward on stretchers and also sent scouting officers dressed as stretcher-bearers; the *Australian Official History* records such instances

⁵ Illustrations of this are given in the *Australian Official History* in connection with the Battle of Dernancourt (Vol. V, p. 395-6n). As in all wars numerous instances of a contrary tendency could of course be found, but they were the exception rather than the rule. The following statement by one of the best R.M.O's in the A.I.F. (in 1942 Col., W. W. S. Johnston, commanding one of the Australian General Hospitals abroad) presents a situation which, though exceptional, was not unique:

"By some hours afterwards we had cleared the R.A.P. and the Companies had reported that there were no casualties left in the line. For some reason I decided to go up to one of the Companies and see that there were no more wounded to be attended to. On arrival I found a collection of prisoner casualties, about whom nothing had been said—18 of just about the worst wounds I have ever seen gathered together—fractured femurs, penetrating abdomens, fractured skulls. I was very angry at not having been informed, especially as it was now well on in the afternoon. But the Company Commander took up the attitude that he was not going to make his tired-out Stretcher Bearers do any more work, and therefore he had not evacuated the prisoners. I set to with my medical orderly and we spent several hours trying to fix up these ghastly wounds. I sent back word to the 1st Field Ambulance (who were evacuating for us) explaining my predicament and asking for the wounded prisoners to be evacuated. They were very helpful, as always, and sent along a horse ambulance (which got stuck in the mud). Eventually they collected the whole lot. Our own Company Stretcher Bearers were very generous and, tired out as they were, some of them volunteered to carry back. But the incident raises an interesting question as to the lengths we should go in the collection and treatment of enemy wounded. Personally I think that here, where there was no special risk attached to the attempt (though certainly a considerable amount of extra fatigue) it was right to treat these men as the human beings they were, not as so many wild beasts."

and also others—though they were probably very rare—in which Australians did the same. Such practices, for the sake of a momentary advantage, probably of little value, imperilled the whole system of bringing the wounded to safety, and few responsible officers would dream of permitting them; but they did occur and so far as rescue of wounded was restricted by either side the restriction was probably due mainly to such breaches of international agreement.

Protection of Medical Units. (a) On Land. It is impossible to ascertain how often the damage done to Australian medical units was deliberate, and, if so, whether it was in retaliation for real or supposed injury inflicted by the Allies. The officers of the units that were damaged seldom attributed the act to any deliberate intention. In the Bullecourt battles, for example, when the M.D.S. at Vaulx-Vraucourt was shelled, various explanations were given by Australian officers in justification even though the Australian field ambulance bearers were then suffering on the battlefield the worst interference experienced by them in the war. At other times the medical units that suffered were clearly sited in such positions as to incur resentment.⁶

When all is said, the strength of the Geneva Convention in public estimation was then, and still is, proved by the fact that any breach or supposed breach of it was first class propaganda for the injured side.

(b) On Sea. The Australian outlook and practice is shown by correspondence now among the records at the Australian War Memorial from the D.M.S., A.I.F., Surgeon-General Howse, in connection with (1) the carrying of armed guards on the Australian hospital ships to maintain internal discipline and (2) the use of hospital ships for transportation of non-combatant personnel and hospital stores. In each instance the vigour of General Howse's action in maintenance of the letter and spirit of the Convention produced a profound impression on the officers concerned. The same may be said in connection with his whole outlook and actions in relation to the Geneva mandates which, in spite of his close association

⁶ A case in point was that of No. 1 A.S.H. at Gallipoli when, as the commanding officer records, it was through force of circumstance sited in close proximity to artillery positions so that, as he said, "no resentment was felt when an occasional shell lobbed near them". For a Light Horse experience see *Vol. I, p. 631n.*

with the military aspect of the medical mandate, he wholeheartedly supported.

The attitude of the A.I.F. is also illustrated by the following memorandum, dated 17th July 1915, from its commander, General Birdwood, at Anzac, to G.H.Q. of the Mediterranean Expeditionary Force:

On July 5th the Transport *El Kahira* was approaching Gaba Tepe when the enemy batteries opened fire on the lighters taking out troops to her. The *El Kahira* altered course and appeared to shelter behind the hospital ship.

2. I think it is desirable that orders should be given to masters of transports and other vessels not to anchor near the hospital ship or in the line of fire to her, as this may be misunderstood by the enemy.

3. I would suggest that the hospital ships be ordered to berth further South of their present anchorage, trusting to their mission to protect them.

They used to anchor due West of Gaba Tepe but moved North to avoid the shells directed at transports in their vicinity. The transports also moved North to avoid the shell fire, and would continue to berth there for the same reason if denied the protection of the hospital ship as suggested in Para. 2.

The work of the Australian Branch, British Red Cross Society. When the Great War began in 1914 the international status of voluntary aid in war had been defined

**The service
of "voluntary
aid," 1914-18**

as clearly as a new and progressive social movement can be.⁷ The war was indeed materially to extend the field open to humane intervention, especially in the direction of treatment of prisoners and search for the missing. The "interior economy", activities, and methods of the national societies of the several belligerents varied considerably, especially as to the extent to which they were permitted to encroach on the field of action of the army medical service. They might assist that service by undertaking accessory activities and promoting "scientific" and extra-military ones and by taking part in the transfer of the soldier,

⁷ Thus the British Red Cross Society issued periodically to its members a leaflet—"Form B"—which defined "the nature of the aid likely to be furnished by the society in time of war". This was "based on the work of the Society in the South African War", and comprised the following fields:

Hospital ships and trains; hospitals, convalescent homes; personnel; articles sent to the seat of war. The latter included clothing, hospital requisites of all kinds, medical comforts, food, etc., and miscellaneous (i.e. kit bag with soap, handkerchief, slippers, socks, pyjama suit, tooth-brush, etc. and various games, books, cigarettes, tobacco, pipes, envelope and paper, pens, pencils, and so forth).

damaged or sound, to civil life, and in the problems of the aftermath.

Perhaps the outstanding feature of voluntary aid in the war was that provided by the U.S.A.; and the views of the American "Sanitary" Service and Red Cross Society on the place of the movement in war and peace were reflected in post-war developments.⁸

It remains to summarise briefly the work of the Australian Branch of the British Red Cross Society in 1914-18. Formed as it was in the course of the war itself⁹ the "Australian Red Cross" was almost wholly without traditions, and, for a time, without knowledge of the place and purpose of "Voluntary Aid". Nor were the heads of the medical service much better informed. The result of this was that Australia, like the Continental Powers, relied unduly on voluntary aid and unofficial sources of supply and service, to the detriment of the

**The Australian
branch,
B.R.C.S.**

⁸ *America and the Red Cross*. America's contribution to the Red Cross Movement has been characteristic and original. As in most of the affairs of life the U.S.A. has paddled her own canoe and her outlook has often differed from that of Europe. To the Conference at Geneva in 1864 she was sympathetic, but fully determined not to be inveigled within the ambit of European politics even for an ideal so congenial to the national sentiment.

"The United States government stands ready to treat with any one, or with all other Powers individually, for the accomplishment of the grand objects of the Geneva Congress, or even to adopt later the treaty stipulations which shall wisely emanate and result from that Congress. The government wishes to act as a free agent, with option in these premises and in its own good time."

The attitude of her unofficial representative was that he had come to teach, not to learn, the "Sanitary Commission" created in the Civil War had (he impressed on the Conference) already solved the very problems which the conference was now exploring. Ultimately, however, the U.S.A. became a signatory to this and to succeeding conventions.

The American Red Cross Society is inseparably associated with the name of Clara Barton. Martin Gumpert in *Dunant. The Story of the Red Cross*, p. 108, says:

"Florence Nightingale was the first civil Samaritan on a field of battle. Dunant followed at Solferino. And Clara Barton, who at the outbreak of the Civil War was a clerk in the patent office at Washington, was the third in this spiritual league which brought about the humanitarian movement of the century."

It also developed on original lines. Thus, trained nursing has been an integral and important element in the system. From 1916 officially, and much earlier in practice, the "enrolled nurses of the American Red Cross Nursing Service" have constituted the "Reserve of the Army Nurse Corps of the United States", and in time of war or other emergency they may "with their own consent" be assigned to active military duty. Medical research and publication were directly assisted.

From its inception the society identified the catastrophes of War and of Peace; and it has been able to achieve international acceptance for this outlook.

⁹ The Australian Red Cross Society was founded in August 1914 as a Branch of the British Red Cross Society on which body its methods and principles were largely based. It consists of a central administrative staff with "Her Excellency, the wife of the Governor-General", as President; with State "Districts" the Presidents of which are, by constitution, "the wife of the State Governor". The objects of the Society were in 1914 set out as under:

"1. The British Red Cross Society in Australia shall be known as 'The Australian Branch of the British Red Cross Society'."

efficiency of the only effective mandatory of the Convention—the Army Medical Service.

It cannot, however, be questioned that, partly perhaps in consequence of this, the contribution of the Society toward the "humane alleviation" of the wounded and sick during the Gallipoli Campaign was notable—indeed, at times in Egypt it "saved the situation".¹⁰ The Australian policy in the first part of the war was (in effect) to leave the administration of voluntary aid at the seat of war to leading members of the medical service. This policy was, however, found to serve the aims of neither party.¹¹ It was changed and the administration entrusted to a self-contained, independent and responsible overseas Staff, directed by "Commissioners".¹² Special offices, storehouses, and transport were secured and organised in an extensive and self-contained system. Immense supplies were sent from Australia, and there was a large local expenditure. The result of this change of policy was fundamental. It brought about acceptance of the principle that while the provision of Red Cross goods and services calls for the exploitation of the emotional appeal, their distribution must be governed by sound business principles, and

"2 The objects of the Branch shall be such as are in accordance with the Geneva Convention, 1906, viz —

- "(a) To supply hospitals, ambulances, vehicles, clothing, comforts, etc., for the sick and wounded in time of war, and to generally supplement the hospitals, medical stores, and equipment for the Medical Services of the Army and Navy.
- "(b) To contribute aid to the sick and wounded irrespective of nationality, even though the British Forces are not engaged
- "(c) To enrol men and women who are qualified by having obtained certificates in first aid and home nursing, into Voluntary Aid Detachments for home service and to co-operate with the St. John's Ambulance Association and Brigade in the formation of units of trained men and women.
- "(d) To render assistance in the case of any great public disaster, calamity or need, subject to the approval of Council, or in case of emergency of the President.

"3. The Australian Branch shall have power to accept money collected for specific Red Cross purposes, and carry out such purposes."

Junior Red Cross. In 1914 the N.S.W. Division of the Australian Branch, B.R.C.S., on the initiative of Mrs. R. R. S. Mackinnon, established a "Junior Branch". The movement was maintained and was soon followed in Canada. Subsequently it was "developed on a gigantic scale" by the American Red Cross Society when the U.S.A. entered the War (*Encl. Brit., Vol. XIX*).

¹⁰ In *Vol. I* the work of the Society is recorded in numerous notes. Its problems are examined in detail in Barrett and Deane's *The Australian Army Medical Corps in Egypt*.

¹¹ In particular it tended to create dependence on "voluntary" efforts for necessities which were properly the responsibility of Army Departments. This was brought out in the (British) enquiry into charges, originating in the A.I.F., of maladministration by the A.R.C.S. in Egypt.

¹² To facilitate relations with the French authorities and secure travelling concessions the senior Red Cross officers were granted honorary commissioned rank in the A.I.F.



35. Packing Food Parcels for Australian Prisoners of War at the A.R.C.S. Stores, London

*Photo from the Red Cross Society
Aust War Memorial Collection No H507*

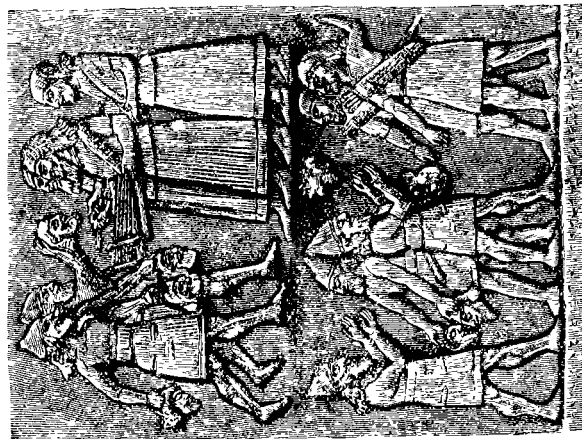


36. Store of Prisoner of War Camp in Germany—German Orderlies are Inspecting Food Parcels.

*Photo from Ms H R Compton
Aust War Memorial Collection No H13925*

IMPLEMENTING THE HAGUE CONVENTION

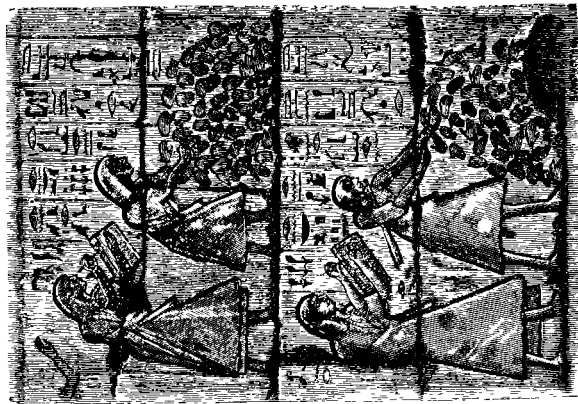
To face p. 988



37. Bringing in the heads of the slain. Assyrian bas-relief (British Museum).

"TOT AL" WARFARE, 4000 B.C.

From article "Atrocities of War", *B.M.J.*, 25 Oct., 1919, by Sir John Bland Sutton. (He notes also the Old Testament reference in 2 Sam. xii. 31, to Amalekite prisoners being "collected, and . . . put under 'aws and harrows of iron . . . and made pass through the brick-kiln".)



38. Scene from a wall of temple at Medinet Habu, showing scribes recording the number of hands cut from prisoners of war.

their distributors informed by exact knowledge of the legal status of voluntary aid and of the actual needs of the soldier as gained through close liaison with the Army Medical Service or other authority responsible under the Conventions of Geneva and The Hague.

After 1915 the A.R.C.S. was concerned with two major theatres of war—Western and Eastern—as well as with a number of minor ones. It is only possible to summarise—as example—some of the outstanding features of its work in the Western theatre, though very fine work was done in the East.¹³

In 1917 the D.M.S., A.I.F., Surgeon-General Sir Neville Howse was made “Chief Commissioner” in an advisory capacity.

Apart, even, from its peace-time activities which, since the war of 1914-18, have been so important a feature of Red Cross work, the Voluntary Aid Service draws its mandate from a wider field of authority than does the Army Medical Service. Thus international agreements regarding prisoners of war, or the search for missing relatives, are only indirectly the concern of the medical service, but are in the official field of the Red Cross. It is a matter of no little significance that the activities of the “International Red Cross” in war fall into two groups—those which concern medical interests, and those which derive from extra-medical problems of humanity. The promoting of the humane work of the Army Medical Service is now only a part—and hardly even the greatest part—of the function of “voluntary aid” in war.

The overseas activities of the Australian Red Cross Society can broadly be listed as follows:

MEDICAL ACTIVITIES—UNDER THE GENEVA CONVENTION

1. *Material.* Provision of—

- (a) extra equipment, stores, foodstuffs, and so forth for the use of the medical services.

¹³ For the important Western theatre the Society was fortunate in the appointment as Commissioner of a Scotchman of outstanding energy and business ability, Mr.—later Sir James—Murdoch, who fitted well with the practical and essentially business-like outlook of the Chief (Advisory) Commissioner, Sir Neville Howse. The Society was not less fortunate in the rest of its staff.

This included—as an instance only—such diverse material as “old linen” (a constant demand); a complete mobile X-ray plant for Gallipoli; stretchers of all kinds and splints; pyjamas (a major utility in some treatment—*e.g.* that of mustard gas); surgical instruments; orthopaedic outfits, and others in almost infinite variety;

- (b) extra comforts for the patients themselves in particular tobacco;
 - (c) means of transport, as ambulance waggons;
 - (d) furnishings, for convalescent homes and of hostels;
 - (e) other material.
2. Provision of facilities for “reparative” and “vocational” training and for recreation.
 3. Visitation of Australian patients in British hospitals.
 4. Agency for the *Comforts Fund* so far as comforts for the medical services—especially the nursing service—were concerned.

The Australian Red Cross Society worked as far forward as the Field Units themselves and through them to the Regimental Aid Posts. An important problem was how to ensure that such provision was really required, and did not serve only to promote waste or to mask departmental inefficiency.

NON-MEDICAL ACTIVITIES—UNDER THE GENEVA CONVENTION AND HAGUE AGREEMENTS

1. Action in respect of prisoners of war.
2. The tracing of missing soldiers and communication with their relatives.

Action in aid of prisoners of war became one of the most important departments at A.R.C.S. headquarters in Grosvenor Street, London. The initiation of the service is described as follows in the final report on prisoners of war by the Secretary of this Department, Miss M. E. Chomley:

When the first Australian prisoners of war were taken by the Germans in July 1916 a separate department of the A.R.C.S. was formed to take care of them. Up to that time the only other Australian prisoners were those taken by the Turks at Gallipoli and the care of these men had been left to their friends. The despatch of private parcels was allowed by the War Office until December 1916 when it was decided to control the amount of food and clothing going to Germany and Turkey. The almost exclusive care of the men was then handed over to the various care committees, and the prisoners-of-war department (of the A.R.C.S.) took complete charge of its men.

From the date of its inception until the Armistice the Australian Red Cross despatched 395,695 food parcels and 36,339 clothing parcels.

It is to be noted that this body worked under the British

War Office and thence through the international organisation at Geneva, The Hague, and elsewhere.

Wounded and Missing Inquiry Bureau. A Department with a big staff, directed by Miss Vera Deakin, was concerned in this humane and valuable service. The high standard of accuracy achieved in the Australian personal records was materially promoted by this work.

In the Australian Army, as in the British, the service of humane alleviation rendered to the soldier by the members of the Chaplains' Department¹⁴ is officially associated with that involved in the humane mandate of the Army Medical Service. In the

**The Army
Chaplain,
1914-18**

Australian Imperial Force an exact establishment of Chaplains was authorised, organised denominationally,¹⁵ and close relations between the Department and the medical service were officially provided for. Both carried out their duties as "non-combatants" under the Geneva Convention, and Field Service Regulations laid down that they should work in close accord. The relations between the two departments were more intimate than before the war and their co-operation increased as the war progressed—possibly through a growing appreciation by each that they were "up against" a common enemy, the spirit of ruthlessness. It did not always happen that this *rapprochement* of the services was to the advantage of the Chaplain; he tended sometimes to lose sight of the spiritual wounds inflicted by the war in the more obvious poignancy of the physical ones. The experience of this war suggests the importance of remembering that the co-operation between these

¹⁴ In the British army its title has, since 1919, been "The Royal Army Chaplains' Department". It stands twelfth in precedence in the British Army, the Medical Department being fourteenth. The Department of the Chaplain-General is co-eval with the British Standing Army. The leading clause in the "Articles of War" used to be that enjoining the celebration of Divine Worship. Unlike Medical Officers Chaplains were, from the first, given a military commission. The Chaplains' Department was designed primarily as an instrument of military discipline; and the relation between it and the Medical Department reflected at first the worst features of each. As the Chaplains became less secular and the Medical Officers more enlightened, and both more ready and able to regard the common soldier as an individual, their common "humane" purpose brought them into closer relations. The Geneva Convention linked them as "non-combatant" in a service of succour.

¹⁵ Four Chaplains-General were appointed, Anglican, Roman Catholic, Presbyterian, and Methodist; other denominations working under "Senior Chaplains". The members of this service were all "commissioned" officers—not an unmixed blessing. Their duties were broadly determined by their Senior Chaplains. The number of Chaplains in the above mentioned denominations was in proportion to the number of their members enlisting—roughly 49, 19, 15, and 10 per cent. In all 386 embarked "for continuous service".

departments is co-operation between personnel engaged in two forms of service which, though related, are distinct. The part of the medical service is to provide opportunity for the exercise by the Chaplain of his "spiritual" function; and by so doing facilitate his co-operation in the humanitarian side of its own work. The physical wounds of war do not lend themselves to "spiritual healing", but its "moral and mental" injuries present an obvious field for this therapeutic co-operation.

Speaking broadly the co-operation of the services along these lines during the war was worthy of each profession.

The Young Men's Christian Association is primarily a Christian body, its motivation, therefore, deriving from the sentiment of humanity and brotherhood. It was **The Y.M.C.A.** thus, like the Red Cross and other humane agencies, concerned with the "humane" activity of the medical service. The chief practical assistance afforded by it to the medical service was the maintenance of the well known "Y.M.C.A. Huts", the social resort and centre in all the Australian General Hospitals.

The "medical", and indeed military, value of Y.M.C.A. work in promoting health and morale by catering for the troops' leisure and filling "idle hands" with wholesome occupation, need not be stressed. At times (as in Egypt in 1914-15) it was a factor of major importance.¹⁶

Although it was still less within the direct perview of the medical service reference should be made to the work of the Australian Comforts Fund. The wide extension of the interests of the medical service and its close involvement on the one hand with the purposes of war and on the other with the "dictates of human-

¹⁶ The interest of this relation is curiously illustrated by the fact that the military command viewed its activities much as it did the humane efforts of the medical service. Thus General Altham (*The Work of the Y.M.C.A. in Egypt*, by Sir James Barrett, p. 98) reports to General Murray: "Close to the firing line the Y.M.C.A. ministrations not only add greatly to the comfort of the men but are I believe a real aid to the efficiency of the Army by the assistance given in maintaining its physical condition. On the Lines of Communication . . . it tends to shield the soldier from moral dangers and from the contraction of disease which may render him for a long time incapable of active service." In *A Rough Y.M. Bloke* Frank Grose gives a lively account of front line activities. Reference to the work of the society will be found throughout the text in the previous chapters of this history.

In the Turkish Army the Y.M.C.A. had a corresponding "Young Men's Islamic Movement", just as the "Red Crescent" undertook in Turkey the rôle of the Red Cross in other countries.

ity" brings this otherwise unrelated activity within the field of medical interest.¹⁷ Its efforts, like those of the Y.M.C.A., were a factor of definite importance in "promoting the health" and therefore the *morale* of the Australian Force.

THE AFTERMATH OF 1914-18

With the war's end, the mandate of the Army Medical Service of the A.I.F. resolves itself into its components, military, civil, humane. As for the military, in the "post-bellum army" the medical service is again "put in its place". The Repatriation Department takes over entirely its responsibilities to the war-crippled soldier. The Red Cross assumes in a great measure the duty of keeping alive the idea of humane service.

1. *The Military Mandate after the War.* That the *technical military status* of the Army Medical Service was enormously augmented by the war is common knowledge.¹⁸ It cannot be denied indeed that the war of 1914-18 fundamentally changed the military status of the Army Medical Service; nor yet that, as it became more and more "a vital part of the machinery of war",¹⁹ so its former position as the *chief* mandatory of the humane conventions has been weakened: increasingly that mandate has fallen to the Voluntary Aid organisation.

Post-war Military Status. Although militarily more important than before the war, the medical service has lost most of its independence. After the war it reverted to its subordinate position and subjection to the control of the Adjutant-Gen-

¹⁷ The history of the Australian Comforts Fund has been presented both in the *Australian Official Histories* (Vol. XI) and in the excellent *History of the Australian Comforts Fund* (S. H. Bowden).

¹⁸ See e.g. the quotation from the text-book *British Strategy* by Sir F. Maurice quoted in the Introduction to Vol. II. The "lessons" of the war appear to have been fairly embodied in the "post-bellum Army". It would seem however that the static outlook engendered in attrition warfare was not wholly eliminated by the events of 1918, and that in the medical service as in military strategy this engendered a "Maginot Line" complex. This appears also to have influenced both medical organisation, and medical strategy and tactics. But speaking generally (and in particular as concerns the "civil" mandate) the lessons of the last war seem to have been thoroughly assimilated, and—even more important—integrated with advances made since the war in medical science and art. In this connection the use by Australia of X-rays in the examination of recruits is outstanding.

¹⁹ Quoted from *A Short History of the Royal Army Medical Corps*, by Col. Fred Smith (Aldershot: Gale and Polden Ltd., 1929).

The paradox is ingeniously even naively summarised in the boast which this author permits himself—"the 1,600,000 men conserved to fight again meant much to the Army—enough almost to turn the scale of war in our favour".

eral; its position in relation to the military command no longer resembled that of the engineering, the artillery or even the supply services. With some assurance this may be ascribed to the continuance of its "non-combatant" status—in other words of the mandate of Geneva. To what extent this subordination is to be regretted will depend on the view held as to the rightful place of the medical profession *vis-à-vis* warfare.

2. *The Civil Mandate handed over.* With the ending of the war the vaguely defined civil responsibility of the Army Medical Service—which began when the soldier was boarded "unlikely to be fit for military service within 6 months"—was passed on to the civil medical profession. The circumstances of the hand-over, and the job made by the civil profession of the responsibility, have been followed in *Chapter XVI* up to the point when preparations for the present war should have begun.²⁰

It cannot be said that there is any very definite evidence that, in Australia at least,²¹ the Army concerned itself greatly in the health and fitness of the post-war generation, nor yet any signs of close liaison between the Ministries concerned.

3. *The Humane Mandate after 1919.* So vastly has the world shrunk—through the development of wireless, of the internal combustion engine, of air travel, of "education" through the cinema, and (till the advent of "autarky") the interchange of commodities and knowledge—that the history of political relations since the First World War is in a great measure the history of international congresses after the style of The Hague Conferences. For the most part they centred round the League

²⁰ Three matters call for brief comment. "*Attribution*" It is clear that *the medical profession should take a hand* in ensuring that *all the records* necessary for a fair and scientific decision in the matter of attribution are available to the utmost possible extent. *Reinstatement.* The records of the war of 1914-18 suggest that it would be of advantage to the army, the soldier, and the State that responsibility for the reinstatement of the war-damaged soldier should be assumed by the civilian agency as soon as possible after he is found unlikely to be again fit for soldiering. The object of such a transfer is to ensure that "curative training" and "vocational training" are closely correlated. To this and other ends *there should be close liaison between the military and pensioning authorities. Recruiting. The mental and physical "fitness" of the community to defend itself is in a high degree a medical problem and should therefore, in the same degree be a medical responsibility.* It may be suggested—though only a minority may assent—that in addition to the social duty of its members as citizens, the medical profession, and the medical service of the army, are in duty bound to *take the initiative* in promoting the physical and mental "fitness" of the people. The wide involvements of such an attitude, if it were accepted and implemented, are obvious, and must call for some degree of reconstruction in the social fabric of medicine. In particular the gulf between the official Service of Public Health and the general Medical Profession should be reduced to a minimum, and co-operation be encouraged from both sides.

²¹ The contrast with Germany, Italy, and Japan is devastating.

of Nations, but they included one important development of the Geneva Convention when, in 1929, a conference was called by the Swiss Federal Council with a view to revising the Geneva Convention of 1906 and to the elaboration of a Code relating to Prisoners of War. The Conference examined two draft Conventions approved by the Tenth and Eleventh International Conferences of the Red Cross, and drew up two Conventions for signature by the plenipotentiaries: (1) *The Geneva Convention for Amelioration of the Conditions of the Wounded and Sick in Armies in the Field* and (2) *the Convention relative to the Treatment of Prisoners of War*. It made certain "recommendations" relevant to the recognition of the Order of St. John of Jerusalem "and similar nursing Orders"; to the "mission entrusted to the National Societies of the Red Cross and the Voluntary Aid Societies in their work of solidarity among nations"; and to the protection of enemy aliens. The two Conventions were made separately but signed on the same day by all the plenipotentiaries.

The International Convention for the Amelioration of the Condition of the Wounded and Sick in Armies in the Field comprised thirty-nine articles, and dealt with: (i) Wounded and Sick. (ii) Medical Formations and Establishments. (iii) Personnel. (iv) Buildings and Material. (v) Medical Transport. (vi) The Distinctive Emblem. (vii) Application and Execution of the Convention. (viii) Suppression of Abuses and Infractions; and with certain final executive provisions. It was signed by plenipotentiaries from 47 countries, including the United Kingdom and the Dominions. The British Dominions and Japan made a reservation, ultimately rescinded, in connection with Article 28 prohibiting the use of the distinctive emblem for private gain as applied to "private individuals, associations, firms or companies" using it "before the coming into force of the present Convention".

Convention relative to the Treatment of Prisoners of War. This Convention followed up the Hague Conventions of 1899 and 1907, and brought the procedure therein agreed upon into line with the principles and practice evolved in the course of the war of 1914-18. It comprised 97 articles in eight parts: (i) General Provisions. (ii) Capture. (iii) Captivity. (iv) End of

Captivity. (v) Deaths. (vi) Bureaux of Relief and Information (vii) Civilians and Non-combatants. (viii) Execution of Convention.

The articles covered exhaustively every aspect of humane dealing in connection with Prisoners of War.²²

A most significant development after the First World War was the creation, on the initiative of America, of the International League of Red Cross Societies, and the extension of Red Cross activities to the whole field of national disasters. Of great significance also has been the development of the Junior Red Cross, after its original formation in New South Wales, into an organic element of the "Red Cross" movement with a world membership, in 1936, of 15½ millions in 50 countries.²³

As for The Hague provisions concerning *inhumane weapons*, the Versailles Treaty assumed that the use of poison gas in any form was contrary to international law, and this assumption was endorsed by the Washington Conference in 1922 and subsequently in a special "Gas Protocol" agreed to at Geneva. The Italians, to their eternal shame, used gas against the Abyssinian natives, and there have been allegations of its use by the Japanese against the Chinese in the Second World War; but up to the time of writing it does not appear to have been employed by any Western combatant.

Thus to picture the story of humane alleviation during and

²² Japan signed, but did not ratify, this Convention. She has, however, agreed, on a basis of reciprocity, to apply the principles of the Convention during the present war. It may be noted that she both signed and ratified the 1906 Convention regarding the treatment of wounded and sick in the field, and has never denounced either that agreement or the provisions of the Hague Convention of 1907 concerning the laws and customs of war on land (Chapter 2 of the Annex to which concerns prisoners of war). Japan ratified her signature of the 1907 Convention on 13 December 1911, but this Convention contained a provision that it applied only between contracting powers, and then only if all the belligerents were parties to the Convention.

The U.S.S.R. acceded to the Sick and Wounded Convention of 1929 on 26 September 1931. It is not a party to the Prisoners of War Convention. Neither Convention was actually signed on behalf of Russia, which apparently did not send representatives to the 1929 Conference.

Germany ratified both conventions on 21 February 1934. The non-ratifying States are practically confined to the U.S.S.R. and the South American Republics. At the outbreak of this present war Japan, Finland and Thailand had not ratified the Prisoners of War Convention. All of these States had ratified the earlier Conventions. Apparently the term "Armies in the Field", confines the application of the Conventions. Sufferers who are not members of those Armies are protected only by the general Laws and Usages of War.

²³ In 1938 the Australian Red Cross Society, which hitherto had been a branch of the British, was accredited as an independent member of the international organisation, independent status having been granted to Australia by the Statute of Westminster.

after the First World War as one of the complete breakdown of the Geneva and Hague Conventions is to travesty the truth. It is true that their provisions have been contested and largely ignored by elements in Armies and Governments motivated sometimes by fear, in other cases by the principle that might is right; but their history in these years has rather been that of a struggle between these elements and the mass of opinion in most countries, even the most totalitarian, which insists on the avoidance of what it deems unnecessary suffering in war. It is far from a negligible result that, throughout the First World War there was steadfastly maintained the right of the wounded soldier to unimpeded rescue and care, the rights of prisoners of war to the privileges accorded them by the Conventions, and the right—unquestioned, so far as the writer knows, in any army—of the medical service to carry out the international mandate. These results were in great part due to the will of the fighting soldiers themselves, and to public opinion. Further, it is by no means without significance that, in the period between the two World Wars, the field of the Conventions and the organisations for implementing them have, by the will of the world's people, been in some respects extended.

The chief and most terrible menace to humanity to-day—the rise of the Nazi group and its bedevilment of the German people—lies in the fact that while many of the methods of that group²⁴ are ultra-modern, its end is one from which man has painfully climbed through 4,000 years of groping, striving and suffering. The humane ideals of to-day—whether they rest on the basis of “religion” or of “humanity”—have evolved through the gradual emergence, in cycles of human culture, of the idea of a common humanity, of the inherent rights of individual man as against the social mass; of the weak against the strong; of humanity and sympathy against power. As Bertrand Russell finds himself compelled to assert:

**The future
of humanism
in war**

... power is the means, in ethical contests as in those of politics. But with the ethical systems that have had most influence in the past [of

²⁴ Its outstanding feature is the union of the German people in the terrific drive of a religious war. “The Germans are always so badly deceived because they try to find a deceiver. A popular leader must hold up before them the prospect of conquests and splendour: then he will be believed. They always obey, and will do more than obey, provided they can get intoxicated in the process.” (Nietzsche.)

modern civilisation] power is not the end. Although men hate one another, exploit one another, and torture one another, they have, until recently, given their reverence to those who preached a different way of life . . . the principle of universal sympathy conquered first one province, then another. *It is the analogue, in the realm of feeling, of impersonal curiosity in the realm of intellect; both alike are essential elements in the mental growth.* . . . ²⁵

On the 8th of January 1938 there appeared in the *Lancet*, a sub-leader with the arresting title "*The Red Cross: an end or a beginning?*" After examining the trend of modern warfare, its writer considers the attitude of members of the medical profession toward the trend of modern war that has here been discussed:

The future
In the first place they may feel that their everyday endeavour to relieve misery and save life . . . is betrayed and almost made ridiculous if they must be ready at any moment to take part . . . in wholesale damage to human bodies and human happiness. Secondly, they are in a peculiarly favourable position to understand the emotional disorders causing war and to realise its needlessness and biological futility. Thirdly, and most important, they have all more or less consciously accepted the advanced creed defined in the declaration used as a motto by one of our hospitals: *Homo sum; humani nihil a me alienum puto*—a statement that the doctor will serve all mankind, finding nothing and no one unclean. To-day the large majority of Europeans are patriots and content to be so. . . . A group, however, believes that a loyalty more comprehensive . . . is needed; that the principle of mutual aid must be applied to mankind rather than to sections; that war between men no longer serves a biological purpose; and that the true struggle for existence, which alone justifies the sacrifice of life, is the struggle of man as a whole against nature.

Commending these principles as the basis of a new outlook and even objective the writer concludes:

In so far as mutual aid is in truth the main civilising force among men, this new red cross would be a banner of civilisation, as the old has often been; and those who fought for it would be able to bring a positive ideal before a world that is unquestionably asking for positive ideals. In this campaign, however, they would need more than heroism; they would need a change of heart. For in the circumstances of to-day it is all too evident that nearly all of us are English or German or Japanese or communists or property-owners before we are doctors and scientists.

Once passed out and lost in the course of social evolution, the power of this "instinct" to dominate men's motives is not readily regained. The impulse to sympathy is of complex origin,

²⁵ *Power: A New Social Analysis*, p. 260 (Basic books, by arrangement with George Allen and Unwin Ltd, London 1940). The italics are not in the original.

and, though elemental, is not among the more crudely powerful of the elements in man's "instinctive" make-up. Resentment and repudiation of this endeavour to thrust man back from this hard won ethical achievement into primitive inhumanity must, therefore, be accounted as among the most vital motives for which the Second World War is being fought.

The Army Medical Service seems to be at the parting of the ways. One road might lead it to complete devotion to purely military ends—the winning of war at any price.

**Future of the
Army Medical
Service**

If that happened, the task of keeping alive the principle of humanity and of safeguarding the social interests of the State and the individual would be left more and more to the voluntary and civil organisations. On the other hand, in spite of the military commitments of ruthless warfare, it may retain its triple responsibility.²⁶ Which way it goes must depend on the extent to which medicine, regarded as a social group, tends to give its soul as well as its body to the ideal of "total" ruthlessness²⁷ or, (on the other hand) to co-operate with civil social influences in maintaining the humane ideal, which has its consummation in Christianity, towards which *homo sapiens* has slowly, painfully, but bravely climbed from the primeval jungle.

²⁶ The late Sir Neville Howse, D M S., A.I.F., who thought much on this matter, believed that the medical service must either be integrated wholly with the army, as combatant, or must more exactly implement its humane responsibility. The distinction between combatant and non-combatant units and spheres of action should, he held, be more clearly defined. The following is a note by the Medical Collator made in conversation with Gen Howse in 1919:

"General Howse had favoured in France (but had, owing to the position of Australian administration, no opportunity for officially voicing his views), the idea that definite areas should be set aside for the medical organisation in connection with the treatment of sick and wounded, which should be accurately delimited and notified to the enemy, and within which no combatant should enter save as a patient.

"He had freely and openly spoken on these lines to the D.G.M S General Sloggett, and with our own G O C and General Staff."

²⁷ It is difficult to ascertain whether or not the medical professions in Germany, Italy, and Japan have subscribed to the doctrine of moral "totality" in warfare practised by their national leaders, but from the survival of the Geneva Convention, and from the appeals constantly made by pagan leaders to Christian or other humanitarian principles, it is evident that these principles still have some considerable hold on the minds of their peoples.

APPENDICES

APPENDIX No. 1

PAST HISTORY OF CHEMICAL WARFARE: THE HAGUE CONVENTIONS

The use of poisonous gases in warfare was forbidden by International agreement.¹ The relevant clauses of the Hague Conventions of 1899 and 1907 are as follows:

"The Contracting Powers agree to abstain from the use of projectiles the object of which is the diffusion of asphyxiating or deleterious gases."²

"Besides the prohibitions provided by special Conventions, it is especially prohibited:

- (a) To employ poison or poisoned arms;
- (b) To kill or wound treacherously individuals belonging to the hostile nation or army;
- (c) To employ arms, projectiles, or material calculated to cause unnecessary suffering."³

Neither in conception nor in practice is chemical warfare (as is often implied) a new thing. The ancient world did its best with such

¹ For the factual data for this introduction the Author has relied chiefly on the following writers. A. A. Roberts (*The Poison War*), Edward B. Vedder (*The Medical Aspects of Chemical Warfare*), Rudolf Hanslian (*Der Chemische Krieg*), Victor Lefebure (*The Riddle of the Rhine*), together with the several Official Histories of the War, and relevant Official Publications, as the text of the Hague Conventions.

² Many of the powers did not sign this declaration until considerably later. Germany and Great Britain signed and ratified it. The United States did not. The reason for this is stated in a memorandum from Sir J. A. Fisher to The Marquess of Salisbury, 20 July 1899 as follows.

"On Captain Mahan (the United States Naval Delegate) being pressed to-day by the President at the meeting on the first Commission to withdraw his original voice in favour of the employment of asphyxiating shell, he reiterated his argument that he considered the use of asphyxiating shell far less inhuman and cruel than the employment of submarine boats. . . . The United States Government was adverse to placing any restriction on the inventive genius of its citizens in inventing and providing new weapons of war" (*The Poison War* by A. A. Roberts, Appendix VI, pp. 142, 143.) See also *The Medical Aspects of Chemical Warfare* by Edward B. Vedder.

³ Appendix to the Hague Convention 1907, Article 23. This article was adopted at the fourth Plenary Meeting held at The Hague on 17 August 1907. The Convention as a whole was signed and ratified by 25 powers (Austria-Hungary, Belgium, Bolivia, Brazil, Cuba, Denmark, France, Germany, Great Britain, Guatemala, Haiti, Japan, Luxembourg, Mexico, Netherlands, Norway, Panama, Portugal, Roumania, Russia, Salvador, Siam, Sweden, Switzerland, United States). Ethiopia signed it in 1935.

"chemical" substances as could be assembled and applied effectively to the purposes of war. Thus in 429 B.C. in the Peloponnesian War the Spartans used the poison gas of the day—fumes from burning sulphur, pitch and charcoal against the city of Plataea.⁴ The Romans scorned and would have none of it but throughout the wars of the Middle Ages chemicals as smokes, gases, vapours, liquids and solids⁵ were used on occasion as weapons of offence and defence in siege and trench warfare—until the advent of gas shells, their only useful place. The only inherent difference between these crude applications of "chemical" knowledge and the "triumphs" of 1915-18 lay in the immense extension of this mode of warfare and the accuracy with which the chemical weapon was applied to promote tactical offence and defence. The development of chemical warfare was not more unnatural nor its technique more remarkable than was the application of chemical research (as by Nobel) to the science of ballistics, as seen in smokeless powder, the machine-gun, and the high explosive shell.

Between the throwing of quicklime or burning of sulphur, and the modern gas cloud, or barrage of complex and scientifically selected chemicals projected in gas shells, lay the vast edifice of modern science, the modern industrial system and "mass production"—in short, the German Interessen Gemeinschaft ("I.G.") the Colossus of Chemical Industrialism. It is well to recall that as late as 1854 the vision of gas warfare had not advanced from that of fumes from burning sulphur.

The material source of this vast new menace to humanity lay in the industrial exploitation of chemical discovery. "The chief cause of the chemical war" says Victor Lefebure, "was an unsound and dangerous world distribution of industrial organic chemical forces."⁶ Before the war Germany led the world in applied (industrial) chemistry in particular in the synthetic production of dyes and drugs. She thus possessed a highly developed technical plant and trained personnel available for the large scale production of chemical weapons, and for their tactical exploitation. Of even greater importance she had developed—*more sua*—a vast interlocking organisation, the Interessen Gemeinschaft which could readily be integrated with the correspondingly "scientific" organisation of the German Army.

"British chemical supply was weak," says Lefebure,⁷ "owing to the absence of a strong organic chemical industry . . . German flexibility of supply meant flexibility in meeting the requirements of military policy, and, given sound military policy, this flexibility meant surprise, the essence of successful war."

The rejection by the British Government in 1855 of the suggestion by Lord Dundonald to employ the fumes of burning sulphur on a large scale against the defenders of the Malakoff and Redan works in the

⁴ *Thucydides, Book II, 77*

⁵ In the attack on Belgrade in July 1456 the Turks used the acrid smoke from burning straw. The Hungarians, under Hunyadi retaliated effectively with faggots steeped in sulphur. Quicklime was used with useful lachrymatory effects in local Italian wars of 1284.

⁶ *The Riddle of the Rhine, p. 24* (The Chemical Foundation, Inc. New York City. 1923).

⁷ *Ibid., p. 65* In 1887 Prof. Baeyer, the renowned organic chemist of Munich, suggested the harmless lachrymators as proper and peculiarly suitable substances for use in war.

siege of Sebastopol⁸ marks a cardinal phase in the evolution both of gas warfare and of international ethics. The decision is in the direct line of human social progress with the Geneva Convention of 1864, the anti-slavery bill, the social legislation initiated by Charles Dickens and Lord Shaftesbury and The Hague Conventions. A definite move was made for the first time to apply the Christian ethic in the sphere of social and international relations. In the belief that the most promising line of approach to the problem of warfare was by achieving a general recognition of its essential inhumanity by incriminating its most obvious and repugnant cruelties, The Hague Conventions denounced some of these as illegal. Among these (whether rightly or wrongly matters little) was included the use of poisons, and of asphyxiating gases (in shells). It is irrelevant to the fundamental issue that the contentions advanced by Admiral Mahan have been justified by the developments of gas warfare; in particular the success of the "gas mask" and extensive use of "persistent" vesicant and non-lethal irritants. The relatively "humane" and non-lethal character of the chemical weapons used in the later part of the war was incidental, not deliberate, and depended chiefly on the efficiency of the defensive measures possible to the *military forces of a scientifically organised nation*, and on the low vapour tension of dichloro-ethyl-sulphide. That this state of things is liable to shocking reversal under other conditions, such as those of totalitarian warfare, hardly needs to be stressed. The gas first used, chlorine, though among those most easily resisted, is the most cruel of any in its action. Even "boiling in oil" could hardly bring a death more dreadful.⁹

It is however unprofitable to attempt a too nice or scientific adjustment between the relative degrees of cruelty of various weapons and modes of warfare, which is best left to human common-sense and sensibility. The "crime" of the Germans did not lie only, or even chiefly in the fact that gassing can involve a cruel death, but in the breaking of international law, whereby alone the social cosmos is maintained. The social sin that is without forgiveness is treachery. The supreme treachery is that against our common humanity; and when, on 22nd April 1915, without provocation, without denunciation of The Hague Convention, and after exact and prolonged preparation,¹⁰ the German High Com-

⁸ *British Official History, Diseases of the War, Vol. II, p. 242.* Hanslian, *loc. cit.* (orig. ref. Panmure papers—1908). It was rejected "on the score of its inhumanity, for it was felt that an operation of this nature would contravene the laws of civilised warfare".

⁹ "Most of the men were in a choking condition, making agonising efforts to breathe, clutching at their throats and tearing open their clothes. At one moment they propped themselves up to gasp, at another they fell back exhausted by their struggle. The skin was cold. There was marked cyanosis, especially of the lips and ears, and in a few cases a light yellowish frothy discharge was escaping from the mouth and nose. Some, especially the older men, were in a state of collapse, their faces and hands were of a leaden hue, their heads fallen forward on their chests. The majority of such cases did not rally. All, except those moribund or collapsed, were fully conscious and fighting desperately for life. Fourteen men died out of the first batch of seventeen taken off the motor ambulances." (*British Official Medical History, Diseases, Vol. II, pp. 384-5*)

The cases described resulted from cloud gas used in May, 1915 composed of chlorine.

¹⁰ *Provocation.* This was candidly acknowledged by Prof. Haber, the German expert responsible for the introduction of gas warfare. (*British Official History, France and Belgium, 1915, Vol. I, p. 194.*)

Preparations for gas warfare began within a month or two of the outbreak of war. (Lefebure *The Riddle of the Rhine, p. 35.*)

mand, with the willing co-operation of German scientific and industrial leaders, released chlorine gas from cylinders at the British-French junction in the Ypres salient, it was guilty of a treason against humanity for which modern history before Hitler can provide few parallels. A staggering blow was dealt at the sanctity of human pledges and the sense of humane obligation, and, with these, to the high hopes that had been held that "religious" emotion and "scientific" rationalism might together give a clear lead to the human race in its long and terrible ascent to the stars.

APPENDIX No. 2

REPORT BY THE REGISTRAR, No. 2 A.A.H., SOUTHALL, TO THE D.M.S., A.I.F., ON PROSTHESIS IN THE UPPER LIMB

No. 2 A.A.H.
Southall,
9th July 1918.

DEAR COL. ANDERSON,

As requested, I have carefully looked through the statistics sent by Pensions which are very interesting.

The natural question arising (seeing that out of 2,483 arms supplied only 35 per cent are used regularly) is,

Is the Nation justified in supplying arms when the results are so poor?

On analysing the statistics the main feature that struck me was the depressing poorness of results everywhere. Although some hospitals got better results than others yet the difference was not marked. As one would expect below elbows have a greater percentage of successes than above elbows. I am at present of the opinion, from reading these statistics and from my own limited experience in arms—

1. That with better tuition the artificial arms now on the market would be much more used. Care should be exercised in giving the amputee the arm suited to his occupation and only such fittings as he may be expected to use. He should be warned that for the first few months the arm will feel hopelessly awkward and that on him and him alone depends whether this arm is to become a useless encumbrance or a useful member. We have all seen what can be done with an artificial arm in the case of doubles where they have first the stimulus of necessity and secondly the absence of the odious comparison which the sound arm always bears to the artificial. He should be taught the use of his arm and its fittings. If this were done the percentage of arms used would be much greater.
2. When experts have more time to devote to the improvement of artificial replacements the artificial arms will be simplified and this will still further increase the number of successes.
3. The amputee who is given an artificial arm with the whole gamut of fittings should not be allowed to have these fittings until he has shown the ability to use them.

We have the experience of a man now at Administrative Headquarters, A.I.F., who clamoured for numerous fittings and got them, and whom we gladly got rid of without training in the use of his arm. This man stands at the entrance steps at Adminis-

trative Headquarters while his arm with all its expensive trappings reposes (probably seven days out of seven) at his billet. *Experientia docet*.

Analysis of the different types of arm in use do not throw much light on the subject. I believe that most of the arms can be made useful with practice and perseverance. The elbow of course gives an enormous advantage. With improvements being and to be executed in arms it is as unwise to talk of the marked superiority of one arm as to dogmatically maintain that no smoke can be had from any but a "Dunhill" pipe.

Analysis of occupations shows that on the whole the labourers use their arms more than those in sedentary occupations which is to be expected. The gardeners stand out well because in the case of their tools they are simple but require two hands and this probably accounts for the number that have become efficient. To summarise

1. Choose the type of arm carefully.
2. Train thoroughly and for several months.
3. Give finally only those fittings which the amputee will use.
4. Impress on them that success depends more on them than on anyone else.

(Sgd.) H. O. LETHBRIDGE, Major, A.A.M.C.

APPENDIX No. 3

AN AUSTRALIAN'S EXPERIENCE IN THE R.A.M.C.

Further extracts from the comments by Dr. S. F. McDonald based on the experience of Australians in the R.A.M.C. during the war are as follows:

There were many Australians with the R.A.M.C. It is safe to say that anyone who belittles the Imperial officer and soldier never saw these latter from inside. One of the happiest, keenest and most efficient Units in France contained English, Irish, Welsh, Australian, Canadian, and South African medical officers.

There was often much misunderstanding at first—everybody got it, especially from the Regular officer of the worst type. But once a man showed that he was willing to work and associate with his fellows he seldom had more trouble.

To the better type of young R.A.M.C. commander the Australian soon adapted himself—he was usually ready to turn his hand to anything. One Colonel welcomed his first Australians with the remark that he liked Australians—he'd seen them in South Africa where they would eat anything, sleep anywhere, and work all the time. Possibly it was in the Base jobs that Australians shone least. There the creature comforts were greater and the risks less, and too often the Hospitals became staffed by permanencies, whom the C.O. knew and liked, and knew he could trust. When the Australian stayed long enough in a Base Unit to become known he was usually kept till his restless spirit was irked at the monotony and he applied for a move further on.

It was safe to say that those who served in British Units came back with a broader outlook and a wider sympathy. The English crust was broken—there was generally little difficulty with "Imperial" Scotch or Irish—and what good stuff there was under relations that crust! The courtesy and kindness, the willingness to help, and the smiling tolerance of another's point of view; with an intense contempt for swank and "side", for meanness and trickery, and for anything calculated to "let a fellow down".

And the courage. It is the fashion among a certain section of Australians to sneer at the British, especially after the Fifth Army disaster; but at no time was the Australian morale taxed as was the British by the awful strain on the home front. It is one thing to face an air raid or a shelling in person, it is another to know that home and family are in the same risk, and above all, are hungry. No one in Australia knew hunger, everyone in England did—it was share and share alike—and every leave

¹ See Vol. I, p. 518 and Vol. II, pp. 806, 829n.

only made the strain more evident to the soldier. Among many Australians the idea of the British soldier was gained from the shattered remnants of the Fifth Army. This wreckage the writer also saw under the same unfavourable circumstances. On the other hand he had many friends in the Fifth Army Units and the blame for that debacle must, it has always seemed to him, be on the shoulders of the higher command. When the dissolution began Field Ambulance, C.C.S. and Ambulance Trains, left to their own initiative (took it) very eagerly.

On the side of the Regular officer (in the trouble between him and the civilian profession) there was much to be said. He *was* a soldier; he knew how his Army was organised, transported, fed and administered, what to do with his patients, why and how. The lack of such knowledge was well seen in the extreme failures that many of the Red Cross Hospitals produced. There were instances, too, when the Temporary officer must have been a sore trial to his seniors—not infrequently from sheer excess of zeal. Also time often hung heavy, the periods of inactivity not yet being lightened by schools of instruction or other means. Many Temporary officers were actually suffering heavily financially and at times there was a tendency to answer back. On the other hand the very knowledge of the proper way to do things sometimes made the Regular C.O. unable to adopt a more expedient way.²

Much of the attitude of the Regular towards the Temporary officer was inspired by the very definite fear that the latter might demand a share in the higher posts. Towards the end of the war such things did happen: in France there were Territorial A.D's.M.S.—but little more; and in Palestine the D.G.M.S. for Armageddon was a Territorial.

Every unit had a Quartermaster—in many cases a man in the prime of life, in others just about to retire or just retired on pension. These officers were not medical men; they had risen from the ranks and had a spotless record for good conduct, especially for sobriety, and a thorough knowledge of the internal running of the Corps. A quartermaster had usually served in his warrant rank as a regimental Sergeant Major—a man of great weight and character—his Colonel's left hand and the company officer's or adjutant's right. The quartermaster was at once the enemy and the best friend of the Temporary officer; let him suspect an officer of trying to overreach him in any matter of unauthorised stores, and he became as adamant; let him realise that an officer was doing his best in his job and there was no one more helpful. To the Quartermaster must be assigned much of the success of the R.A.M.C.

Unfortunately the highly trained, conscientious and devoted orderlies of the first few months were all too few for the mushroom expansions.

Their places in the ranks were filled by every possible form of P.B. man, who had often made a tour of half the branches of the service—a failure in each, to come to rest at last in the base units of the R.A.M.C.; it speaks volumes for the work of the Officers, Sisters and N.C.Os (most of all perhaps the last) that the standard of nursing in the later days of the war was at

² For example an ex-house surgeon from St. Thomas's Hospital who was attached to the R.C. Ambulance Convoy at Ypres was met by a friend in a field ambulance with the request for morphia—theirs was exhausted. Gladly he gave a liberal amount—he still had plenty. The recipient received a brutal reprimand from his Colonel for not waiting to procure stores from an "authorised source".

least as high as that in the earlier stages. Before the great dilutions took place the trained personnel knew their work so well that even an incompetent C.O. would have little trouble. Later on when perhaps one man in 5 or 10 was trained—matters were very different, and the C.O.'s influence was the supreme factor in failure or success. And then it was that the better type of young R.A.M.C. officer got his chance and in most cases made every use of it. Too often with a personnel made up of the scrapings of the Army the work was done—often on poor rations and worse quarters—with, too often, only the C.O.'s devotion to his men between them and absolute misery.

By no means least in the Army Nursing Services were the members of the Voluntary Aid Detachments. These were girls who had in peacetime from motives of public spirit undergone a certain amount of voluntary nursing training. They were often the sisters and daughters of the Territorial officers, or retired Regular officers.

And what if any are the lessons to be gleaned from the R.A.M.C. by an Australian Medical Service?

Esprit de Corps. First and foremost *esprit de corps*—founded very largely on tradition and training. The conduct of the R.A.M.C. in this and previous wars was constantly being cited as an incentive to good work; it was not for nothing that the only bars to the V.C. were won by R.A.M.C. officers. Previous V.C.'s in the Corps were quoted, sometimes with a good deal of laughter, often with the most intense respect. Tales were told in messes of cholera epidemics in India and malaria in Africa, where men went out to work and die "because it was all in the day's work", and the devotion of the medical officers in the typhus epidemics³ was taken usually as a matter of course. It was surprising to find how much the lower ranks knew of Corps achievements in previous wars, and how obscure and unrewarded gallantry was rumoured and treasured in this one.

Training. The peace-time training of the R.A.M.C. was most efficient despite two great handicaps. The first of these was the fact that the units were seldom working as such but were scattered through a dozen military hospitals. This made the mobilisation of the R.A.M.C. most difficult. Majors met their Colonels for the first time. The Sergeant-Major and Q.M. were more likely to have met, and possibly some of the other rank and file; but the junior officers often had neither seen their seniors, their fellows, nor their men. The second was the fact that the *drivers* were no part of the Corps, and had no strong ties with it.

As against these defects it was held that the training system of the Corps was so thorough that any trained man was fit to take his place and "carry on" in any Unit to which fate or the War Office might allot him.

The Q.M. and N.C.O. Apart from purely medical qualifications the greatest strength of the Corps undoubtedly lay in its *Quartermasters* and *Sergeant-Majors*. Such men are not produced in a moment; what steps are being taken in Australia to train them? There are tales—which may or may not be true—of Australian medical units and their troubles

³ In the terrible episode of the Prisoners of War camp at Wittenberg, in Germany. (*A Short History of the Royal Army Medical Corps* by Col. Fred Smith). See p. 982n.

in administration and discipline in their early days—and in their later days, too; whereas such troubles in the British units with “Regular” Quartermasters and Sergeant-Majors were unknown.

Trained Army Sisters. An added strength was undoubtedly the Q.A.I.M.N.S. *Regular Sisters*. Here, too, *esprit de corps* and training counted for much—there was less of the personal element, less of the jar of training school jealousies.

The place of “eye-wash”. The very eye-wash so much despised by many of us at the time undoubtedly served a useful purpose and helped patients to forget the dreary disorder of the war.

System of recruiting, grading, and promotion. Finally there should be one system of recruiting and grading medical officers. The three systems in the British Army undoubtedly caused much friction—not so much between the officers themselves, as in their attitude to the higher powers. Especially was this the case with certain special Territorial Hospitals in which officers only just arrived in France were given higher rank than many who had been in France years before and had far more of both military and scientific experience.⁴

Specialists, clinical and research. So too, the appointment of specialists—the encouragement of research and the control of rewards are matters in which much care must be exercised if the Medical Service of the Commonwealth are to profit by the lessons of the R.A.M.C.

⁴ cf. Vol. II, Chap. xxvi.

APPENDIX No. 4

OBSERVATIONS BY COLONEL H. C. MAUDSLEY, SEPTEMBER, 1919. ON MEMBERS OF THE A.I.F. BOARDED BY HIM IN ENGLAND DURING THE YEARS 1916-1919

TO MAJOR-GENERAL SIR NEVILLE HOWSE, V.C., K.C.B.

I have the honour to submit to you some observations on my experience on a part of my work as Consulting Physician, namely that of reviewing the men invalided to Australia for medical reasons. The first part of my report deals with cases whose disability ante-dated military service in England or at the Front, *i.e.* on active service. The second part with the cases whose disability was acquired and caused on active service:

PART I. MEN WITHOUT SERVICE AT THE FRONT

In June, 1916, in a report I made to you I stated my opinion that men suffering from certain diseases should not have been enlisted and I advised that in future such men should not be sent from Australia on active service but still they are sent. I will deal with them under the categories of my first report. . . .

1. Diseases of the Circulatory System.
2. Diseases of the Respiratory System.
3. Diseases of the Abdominal System.
4. Diseases of the Nervous System.
5. General Diseases.

(a) Cases of organic valvular disease of the heart of long standing and often known to the man before enlistment have been too many. In most cases the disease should have been detected at the time of enlistment. In some of these cases the heart disease has been detected either on examination before going up to the line or when under treatment for wounds or infections and they may have had no symptoms of heart disease and may have gone through their training and have been on active service for months. These cases form a small fraction of the group. More frequently symptoms have developed during training or on active service and have led to their being invalided. Occasionally the symptoms have been those of "effort syndrome" and not due to real heart failure but none the less a cause of unfitness for active service.

(b) Enlarged heart. Hypertrophy and Dilation. A few such cases of doubtful causation but of long standing.

(c) Congenital Heart Disease. Two or three such cases.

(d) Arteriosclerosis. Due to wear and tear or to infection in men between 30 and 45, has furnished a fair number of cases. These men had the appearance of men nearer 50; their vessels were thickened; their hearts were enlarged, and the symptoms developed when in training or after a short time at the front. In many cases there was a history pointing to the cause of the conditions and to the condition ante-dating enlistment.

(e) Functional Derangement of the Heart. D.A.H. There were too many cases of this kind giving a history of symptoms prior to enlistment, some of them had been in civil life treated for "Heart strain" some for "Heart attacks", and had never been able to do any hard work before enlistment. They broke down in their training or after a few weeks at the front.

Recurrent Bronchitis, Emphysema and Bronchitis. Fibrosis of the Lung. Old Pleurisy. Some of these cases were miners but by no means

all. There were too many and most of them broke down either in the early part of their training or later before going to the front. Some of these cases had been obliged to change their occupation on account of their disease prior to enlistment. *Asthma* cases were frequent. Some had been several months at the front but they were the exception. *Old Tuberculosis of the Lungs.* There were examples of men who had been under Sanatorium treatment and others who gave a history of Tubercular Bacilli in their sputum prior to enlistment.

2. Diseases of the respiratory system Cases of *Gastric and Duodenal Ulcers, of Recurrent Indigestion* of a severe type of long standing and causing loss of work in civil life, of *Hydatids* of the liver or abdomen. Some of these cases had the scars of operations for the cause of the condition.

3. Diseases of the abdominal organs Cases of *Epilepsy*, essential and traumatic, some with deficiencies in the skull from trephining. Mental enfeeblement with a clear history from childhood, of severe head injury causing concussion and unconsciousness for days requiring weeks or months of hospital treatment, of severe neurasthenia requiring treatment in special homes, of mental disease requiring treatment in asylums were not uncommon.

4. Diseases of the nervous system Cases of tuberculosis of the lungs requiring sanatorium treatment before enlistment were too frequent. Cases of recurrent, acute, or sub-acute rheumatism up to a few months of enlistment were reviewed and such cases developed attacks when in training or on active service in France. Too many men evidently over 45 and some immature youths, and many of poor physique and some of poor mentality were reviewed.

5. General diseases

PART II. MEN WITH SERVICE AT THE FRONT

A great number of men suffering from War Neurosis were

reviewed. They had been afflicted for months and had been under treatment in British Hospitals and in our own Auxiliary Hospitals. It was evident that most of them were permanently unfit for general service; a small minority might be fit after six months' rest. A great proportion of them should be fit for duty away from the front, or in civil life in a few months.

War neurosis

These cases fell broadly into two clinical groups. (a) The conversion hysterics and (b) anxiety states sometimes termed neurasthenia. A third group comprised the cases in which the manifestations of the conversion hysterics and anxiety states were combined. In some few cases there were signs of organic disease of the nervous system, generally slight. Some of them had been wounded, some had been gassed. In a minority of cases only was there evidence of physical concussion of the nervous system; in a fair number, however, the symptoms dated from and were attributed to shell explosions and burials. Probably the neurosis was developed before the shell explosion or burial and the emotion was the exciting cause of the fully developed condition. In some of the cases the symptoms became manifest after the healing of a wound or after an infection requiring treatment in a hospital, during convalescence.

(a) *The conversion hysterics.* The most numerous were of the usual types described in Medical War literature. Mutism, aphonia, stammering, deafness, blindness occasionally; paralysis or paresis (monoplegia, hemiplegia, paraplegia); contractures, curved spines, gaits, convulsions, tics, tremors, hyperaesthesia, paraesthesia, anaesthesia. Cases of this kind are all curable and should be cured by psycho-therapy as regards their disabilities, but I am of the opinion that few of them would ever be fit for general service. For civil life they should be as fit as ever they were.

(b) *The cases of anxiety states* were the minority. Often there were no marked objective signs beyond general nervousness or rapid heart or profound sweating. *Insomnia*, *war dreams*, and *exhaustion* were usually complained of. From the aspect of the man and from his history it was generally easy to satisfy oneself of the genuineness of his illness. Most of these cases in my opinion would never be fit for general service. A fair number of these cases of war neurosis were of good physique and judging from their previous history were of good "mental make-up", but there were many of poorish physique and with histories pointing to a poor mental make-up. Men were ready to suffer from neurosis on the slightest provocation. Some failed before completing their training and a considerable number had not been to the front.

D.A.H. and Effort Syndrome. In this category, effort syndrome, a fair number of cases attributed their symptoms to shell-shock. It seemed to me that the instinct of self preservation with the emotion of fear acting unconsciously, sometimes consciously, with the excessive fatigue was a great factor in the genesis of many of these cases of War Neurosis especially of those of the conversion hysteria type. It was found impracticable to secure admission of any number of these cases of hysteria into special War Neurosis Hospitals in England. Some few were sent back to our Auxiliary Hospitals and were cured of their present symptoms while awaiting return to Australia. A great number will require treatment in Australia.

A large number of men suffering from these symptoms were

reviewed. In the last six months or longer the term "effort syndrome" has taken the place of D.A.H. The condition itself requires no explanation. It is not a pathological diagnosis but a term applied to a group of phenomena observed in physiological conditions after severe exercise in healthy men; but in these invalided men the symptoms manifest themselves on slight exercise or exertion. The heart is not diseased and such men as have had an infection have been at rest and under treatment for longer periods than are necessary for the recovery of strength, etc. from the infection. Broadly speaking they may be arranged in groups. (1) One well defined group consists of men poorly developed physically or nervously or both, many have flat chests or long narrow chests or deformed chests. Some were nervous weaklings in childhood and adolescence. Most of this group had never done any hard work before enlistment. Many failed in their training or soon after going to the front. (2) Another group consists of men who have been at the front for a long time and have developed their symptoms after long and arduous service. They present no signs of poor development, physical or nervous. (3) Another group comprises men who have suffered from some infection—acute rheumatism, tonsillitis, pneumonia, trench fever, enteric, dysentery, and have not recovered their strength after the average time for such recovery. (4) Another group comprises men still suffering from some chronic infection of the throat, of the appendix, or oral sepsis. (5) Another group comprises men who had been gassed some time previously, (6) and another a few who had been shell-shocked. (7) A few cases were the subject of incipient tuberculosis, of Graves disease, of constitutional syphilis, (8) and a few probably of incipient heart disease. Except in the man over 40 or those with a history of rheumatic fever or syphilis, there was no reason to fear any myocarditis. All these men were either too ill to be trained or the attempts, sometimes repeated on several occasions to train them by graduated exercises and drills, etc. had signally failed. Most of the cases will never be fit for active service though most will recover and be fit for ordinary civil occupations. In some of these cases the symptoms were exaggerated; in a few they may have been feigned. Generally speaking one may say there was no wish to go back to the front. I doubt if any returned to Australia would be fit for active service within six months. The cases of organic valvular diseases and of cardiac vascular degenerations I have already referred to.

A fair number of cases of recurrent or chronic bronchitis were reviewed and a larger proportion than I should have expected were under 30 years of age. Of the cases over 30 some were miners. In many of the cases of the younger class there was a history of bronchitis in childhood. In some the bronchitis had developed on active service.

**Diseases of
the respiratory
system**

Fibrosis of the lung with Bronchitis, a sequel of Bronchitis and Broncho-pneumonia on active service was not uncommon. A good number of cases of fibrosis probably of tuberculous origin were reviewed and in many cases it was not clear when this condition had developed. No bacilli were detected in the sputum in such cases. Active tuberculosis of the lungs with a clinical history pointing to the development when on service was frequent. Probably in most of these cases service strain and other infections of the lung had activated latent tubercular mischief of long standing.

Asthma. Most of these cases were of long standing, ante-dating enlistment. A few had developed for the first time on active service. There were several cases of men who had left England for Australia on account of asthma, who had been free from the condition in Australia, but on their return to England on service their asthma recurred.

Disease of the alimentary canal. A fair number of cases of "gastrotritis" were reviewed. In a considerable number the condition was mainly one of neurosis following "shell-shock" or **Sundry diseases** gas poisoning.

Recurrent diarrhoea following dysentery was not infrequent. Also dysentery carriers whose health generally was below par.

Rheumatism and Myalgia. A great number of chronic recurrent muscular rheumatism and fibrositis have occurred. (1) In the largest groups of this section were the men over 40 who have had a considerable time at the front. These included many men invalided on account of their age. (2) Another group comprising younger men. Some of these had suffered from rheumatism in civil life before enlistment. (3) In another group were men whose so-called rheumatism seemed to me to be a manifestation of neurosis, and there were a few whose symptoms were exaggerated at any rate. (4) In many of all these groups there was evidence of some slight chronic infection, oral sepsis being not infrequent. (5) Recurrent acute and subacute rheumatism provided a certain number for Australia. (6) Some of these had Cardiac affections; some were neurotic. Of the latter some might be fit for service after a lapse of a year without a recurrence. (7) Cases of recurrent sciatica were reviewed and considered permanently unfit for general service. (8) Some of the cases of sciatica were not bad cases but were of the nature of neurosis and (9) a few were probably feigned.

Trench fever. Some cases of recurrent trench fever, with asthma and debility or with marked effort syndrome were reviewed and returned to Australia. Many months would elapse before many of them would be fit for active service.

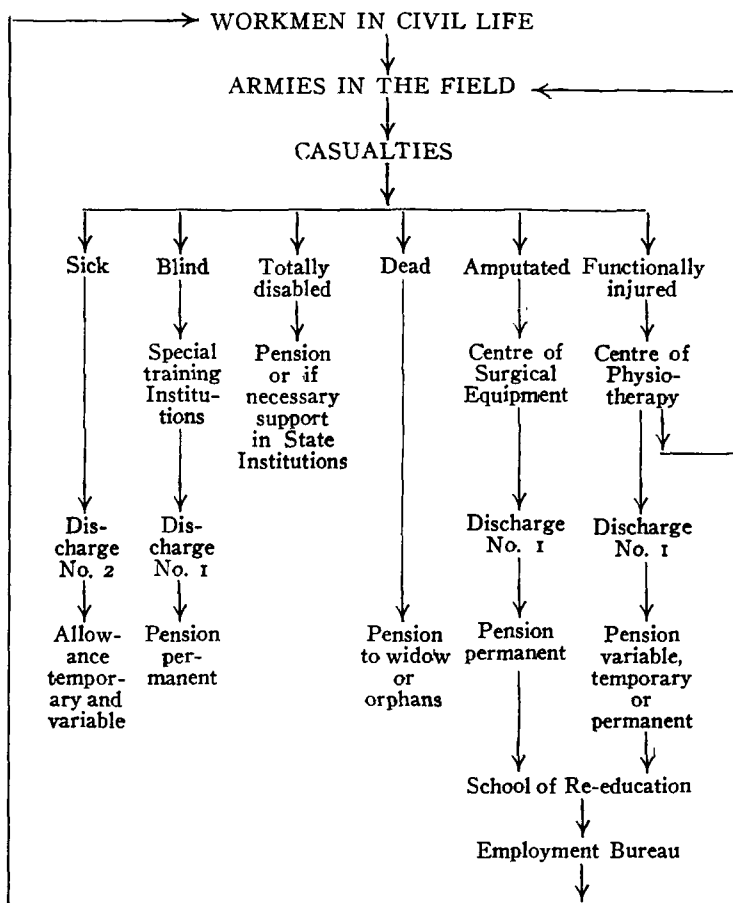
Gas Poisoning. Cases under this category mostly suffered from effort syndrome. Later there were a number who were suffering from bronchitis and fibrosis of the lung and emphysema, and some from asthma without any history prior to gassing. Some were suffering from neurosis.

Nephritis. A fair number of cases of nephritis contracted at the front were returned to Australia as permanently unfit for active service. In some of these cases there was no albumin and no evidence of any cardio-vascular or senile changes. Most of the history pointed to a very definite attack of acute nephritis. In many of the cases albumin persisted but the general health was fair. In a few of the cases the nephritis was still active. A few cases of albumin of somewhat uncertain origin were reviewed. The general health was decidedly poor and they had been under treatment for months. They were returned to Australia as unfit for service for more than six months.

APPENDIX No. 5

THE FRENCH SYSTEM OF INVALIDING IN WARTIME

From page 9 of the Report by Captain Sir Henry Norman, to the Rt. Hon. D. Lloyd George on The Treatment and Training of Disabled Soldiers in France, October, 1916. Published in 1917. (*See Chapter XVI*).



Discharge No. 1. Those who are wholly permanently disabled for any kind of work.

Discharge No. 2. Those who may by re-education be restored to social and professional efficiency in varying degrees.

APPENDIX No. 6

STATEMENT SHOWING SCALE OF RATIONS TO BRITISH AND DOMINION TROOPS IN FRANCE,
AND GIVING REDUCTIONS EFFECTED DURING THE WHOLE PERIOD OF THE WAR, AND UP TO
30TH SEPTEMBER, 1918

Daily Scale Unless Otherwise Stated

Article	Field Ration (Full Scale) for Fighting Troops at Front							Rations for Troops on L of C.*				
	First Scale Drawn up	Scale from 29 10 15	Scale from 4 4 16	Scale from 20 1 17	Scale from about 1.7 17	Scale from 26 1 18	Scale from 23 9 18	Total Reduction per Man per Day	Scale from 17 4.17 (First scale)	Scale from about 1.7.17	Scale from 23.9.18 to 31 12 18	Total Reduction per Man per Day
Meat (fresh or frozen) ..	1½ lb.	1 lb.	1 lb.	1 lb.	1 lb.	1 lb.		5 oz.	12 oz.	12 oz.		2½ oz.
or												
Meat (pre- served) ..	1 lb. (nom.)	¾ lb. (nom.)	¾ lb. (nom.)	¾ lb. (nom.)	9 oz.	9 oz.	15 oz.	(ap- prox.)	—	6½ oz.	9½ oz.	
Bread† ..	1½ lb.	1½ lb.	1½ lb.	1 lb.	1 lb.	1 lb.		3¾ oz. (nearly)	14 oz.	14 oz.	14½ oz.	½ oz. increase
or												
Biscuit or flour	¾ lb.	¾ lb.	¾ lb.	¾ lb.	10 oz.	10 oz.			—	8¾ oz.		
Bacon ..	4 oz.	4 oz.	4 oz.	4 oz.	4 oz.	4 oz.	3 oz.	1 oz.	3 oz.	3 oz.	3 oz.	—
Cheese ..	3 oz.	3 oz.	3 oz.	2 oz.	2 oz.	2 oz.	2 oz.	1 oz.	2 oz.	2 oz.	1 oz.	1 oz.
Fresh vege- tables ..	8 oz.	8 oz.	8 oz.	8 oz.	8 oz.	8 oz.	8 oz.	—	8 oz.	8 oz.	8 oz.	—
or												
Dried vege- tables ..	2 oz.	2 oz.	2 oz.	2 oz.	2 oz.	2 oz.	2 oz.	—	2 oz.	2 oz.	2 oz.	—

APPENDIX No. 7

OFFICERS, N.C.O.'s AND MEN OF THE AUSTRALIAN ARMY MEDICAL SERVICES WHO LOST THEIR LIVES IN THE FIRST WORLD WAR

Note: A list of Nurses who lost their lives is given in Chapter XI.

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
13	Pte.	ABBOTT, Claude	1 F.Amb.	K.I.A.	Gallipoli	29. 5.15
14654	Pte.	ABBOTT, Henry Edgar	10 F.Amb.	K.I.A.	Belgium	12.10.17
481	Pte.	ACREMAN, Benjamin Andrew	2 L.H.F.Amb.	D.O.I.	At sea	1. 1.15
78	Pte.	ADAMS, Arthur James	13 F.Amb.	D.O.W.	France	9. 8.16
14475	Pte.	ADDON, Henry Charles (stated to be HADDON, Henry Charles)	14 F.Amb.	K.I.A.	France	4. 5.17
13252	Pte.	AGNEW, James Whitson Ainslie	12 F.Amb.	K.I.A.	Belgium	29. 9.17
7322	Pte.	ALEXANDER, Robert Ernest	2 C.C.S.	D.O.I.	Egypt	22.12.15
12234	Pte.	ALLEN, George	10 F.Amb.	K.I.A.	Belgium	4.10.17
1395	Pte.	ALLSEBROOK, Gerald	1 C.C.S.	D.O.W.	Gallipoli	20. 6.15
14156	Sgt.	ANDERSON, Albert Victor	2 A.H.S.	D.O.I.	At Sea	8.10.17
13254	Pte.	ANDERSON, David Vallance Kerr (M.M.)	12 F.Amb.	D.O.W.	Belgium	1.10.17
4703	Pte.	ANDERSON, Frank DeWinton	14 F.Amb.	D.O.W.	France	5. 5.17
13933	L./Cpl.	ANDERSON, George Henry	14 F.Amb.	K.I.A.	Belgium	21. 9.17
2	S./Sgt.	ANDERSON, Henry John	7 F.Amb.	K.I.A.	Belgium	24.10.17
3711	Pte.	ANGEL, Leslie Roy	7 F.Amb.	K.I.A.	France	5. 5.17
85	Pte.	ANNAND, Victor William Joseph	1 L.H.F.Amb.	D.O.W.	Gallipoli	8. 8.15
12692	Pte.	ARNHEIM, Leslie Roy (M.M.)	1 F.Amb.	D.O.W.	Belgium	4.10.17
946	Pte.	ARNOLD, William Arden Egerton	3 L.H.F.Amb.	D.O.W.	Gallipoli	17. 9.15
109	Pte.	ARNOTT, Lochiel James Henderson	2 A.G.H.	D.O.I.	France	31. 8.18
12240	Pte.	ASHTON, John Henry Parker	6 F.Amb.	K.I.A.	France	3.10.18
	Capt.	ASPINALL, William Robert (M.C.)	1 F.Amb.	K.I.A.	Belgium	20. 7.17
13255	Pte.	ASTON, Arthur John	12 F.Amb.	D.O.W.	Belgium	10. 6.17
61811	Pte.	ATKINSON, Ernest	A.A.M.C.	D.O.I.	England	3. 3.19
2463	Pte.	AUHL, William Ernest	A.A.M.C.	K.I.A.	France	23. 7.16

4311	Pte.	AUSTIN, Roy (M.M.)	14 F.Amb.	D.O.W.	Belgium	16.11.17
1033	Sgt.	AUSTIN, William John	4 F.Amb.	D.O.I.	France	11.10.18
991	Pte.	AYNSLEY, Richard	4 F.Amb.	K.I.A.	France	6. 5.17
2562	L./Cpl.	BAILEY, Arthur (M.M.)	5 F.Amb.	K.I.A.	France	24. 4.17
	Capt.	BAILEY, Guy Brooke	R.M.O., 52 Bn.	K.I.A.	France	27. 3.17
12242	L./Cpl.	BAKER, Henry John Edgar (M.M.)	10 F.Amb.	K.I.A.	France	11. 8.18
17081	Pte.	BALL, James Percival	7 F.Amb.	D.O.W.	France	4. 7.18
15	Pte.	BALL, James Thomas	2 F.Amb.	D.O.C.	France	13. 2.17
9656	Dvr.	BALLARD, Lewis William	8 F.Amb.	D.O.W.	Belgium	25. 9.17
16121	Pte.	BANKS, Reginald George	13 F.Amb.	D.O.W.	France	25. 4.18
131	S./Sgt.	BANNISTER, William Charles Wagen- knecht	3 F.Amb.	D.O.W.	France	11.11.16
8165	Pte.	BARKER, John Thomas	2 F.Amb.	K.I.A.	Belgium	20. 9.17
16870	Pte.	BARNES, William John	A.A.M.C.	D.O.I.	Egypt	12. 4.19
815	Pte.	BARR, George Herbert	3 L.H.F.Amb.	K.I.A.	Gallipoli	7. 8.15
7732	Pte.	BARRETT, Norman George	6 F.Amb.	K.I.A.	Belgium	5.11.17
18118	Pte.	BARTLETT, Henry James	4 L.H.F.Amb.	D.O.I.	Syria	28.10.18
4008	Pte.	BAUER, Francis Charles	1 F.Amb.	D.O.I.	Gallipoli	20. 9.15
	Lt.-Col.	BEAN, Harold Knowles	3 L.H.F.Amb.	D.O.I.	Gallipoli	25. 9.16
13741	Pte.	BEATTIE, Stewart Miller	A.A.M.C.	D.O.C.	New South Wales	27. 5.18
53	Sgt.	BELL, William John	1 L.H.F.Amb.	D.O.C.	Egypt	25. 5.15
45	Pte.	BENDREY, Ronald Wall	2 F.Amb.	K.I.A.	Gallipoli	6. 8.15
6692	Pte.	BENNETT, James Albert	8 F.Amb.	K.I.A.	France	22.12.16
3673	Sgt.	BICE, George Roy	7 F.Amb.	K.I.A.	Belgium	29.10.17
6491	Dvr.	BIRCH, Arthur Henry	3 F.Amb.	K.I.A.	France	12. 4.18
3251	Pte.	BIRD, Eric James	6 F.Amb.	K.I.A.	Gallipoli	12.11.15
63936	Pte.	BLACK, Charles Arthur	1 A.G.H.	D.O.I.	France	17.10.18
148	Pte.	BLADIN, Henry William (M.M.)	1 F.Amb.	D.O.W.	France	14. 4.17
10297	Pte.	BLAIR, Reginald Claude	2 F.Amb.	D.O.W.	Belgium	31. 8.17
21735	Pte.	BLAKE, George Philip	A.A.M.C.	D.O.I.	France	30.11.18
988	Pte.	BLEAZARD, Walter John	4 F.Amb.	D.O.W.	Belgium	28.10.17
13258	L./Cpl.	BLANNERHASSETT, Arthur William	13 F.Amb.	K.I.A.	France	3. 9.16
	Capt.	BOND, Francis Spencer	6 F.Amb.	D.O.I.	Gallipoli	1. 4.16
110	Pte.	BONE, Cecil	15 F.Amb.	D.O.I.	France	25. 4.18
261	Pte.	BORROWMAN, Albert A. G.	2 F.Amb.	D.O.I.	Egypt	29. 7.15

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
15808	Pte.	BOSTOCK, Arthur Edward	3 A.G.H.	D.O.I.	France	9.11.17
4711	Pte.	BOTTOMLEY, Albert Ernest	5 F.Amb.	D.O.W.	Belgium	4.10.17
2857	Dvr.	BOWD, Stanley Victor Dalketh	15 F.Amb.	K.I.A.	France	10. 8.18
13262	Pte.	BOWMAN, Leslie Emanuel	4 F.Amb.	K.I.A.	Belgium	8. 6.17
11915	Pte.	BOYS, Wilfred Albert	9 F.Amb.	K.I.A.	France	31. 8.18
9122	Pte.	BRADLEY, Charles	8 F.Amb.	K.I.A.	Belgium	20. 9.17
2547	Pte.	BRADLEY, Hugh	2 F.Amb.	D.O.I.	France	2. 2.19
3667	Pte.	BRADSHAW, Edmund Mortimer (M.M.)				
9806	Pte.	BREW, Samuel	7 F.Amb.	D.O.W.	France	20. 5.17
4101	Pte.	BREWER, Charles Joseph	2 F.Amb.	D.O.W.	France	16. 8.18
11917	Dvr.	BRIDSON, James Arthur	2 F.Amb.	D.O.I.	France	10. 4.17
68	Cpl.	BRIGGS, George Harrison	9 F.Amb.	K.I.A.	France	8. 4.17
3018	Pte.	BROCKWELL, Claud Butler (M.M.)	1 L.H.F.Amb.	D.O.I.	Egypt	1. 2.16
1599	Pte.	BROPHEY, Arthur Matthew	13 F.Amb.	D.O.W.	France	6. 4.18
101	Pte.	BROWN, Robert Ervald (M.M.)	1 F.Amb.	K.I.A.	France	18. 4.17
6342	Pte.	BRUNING, Arthur Leslie	1 F.Amb.	D.O.W.	Belgium	28. 9.17
	Capt.	BUCHANAN, Joseph David	13 F.Amb.	D.O.C.	France	8. 5.18
18702	Pte.	BUCKLAND, William Edward	2 L.H.F.Amb.	D.O.C.	Egypt	21.12.15
1632	Pte.	BUIST, Charles Alfred	8 F.Amb.	D.O.I.	Belgium	1. 5.19
4351	Pte.	BULL, Rupert Clark	No. 2 A.S.H.	D.O.I.	Gallipoli	28. 9.15
8621	Pte.	BULL, Stanley Gane	10 F.Amb.	D.O.W.	Belgium	13.10.17
	Major	BULLEN, Norman John	1 F.Amb.	D.O.W.	Belgium	6. 7.16
63	Dvr.	BULLOCK, Bruce	R.M.O., 59 Bn.	D.O.W.	Belgium	16.10.17
6848	Pte.	BURCHELL, Edgar	6 F.Amb.	K.I.A.	Belgium	1.11.17
	Capt.	BURDEN, Clive Britten	15 F.Amb.	D.O.I.	Belgium	27. 1.18
2331	Pte.	BURKE, Herbert	A.A.M.C.	D.O.C.	England	8. 5.17
8169	Pte.	BURKE, Joseph	6 F.Amb.	K.I.A.	Belgium	21. 9.17
1907	Pte.	BURNETT, Frederick	2 F.Amb.	D.O.C.	At Sea	7. 6.19
3010	Dvr.	BUTTERWORTH, James	3 F.Amb.	K.I.A.	France	16.12.16
12594	Pte.	BUTTERWORTH, James	5 F.Amb.	D.O.W.	Belgium	7.10.17
164	Pte.	BUTTERWORTH, James	11 F.Amb.	D.O.W.	Belgium	3. 7.17
201	Pte.	BYRNE, George	15 F.Amb.	D.O.C.	France	22. 2.17
		CADOUX, Donald Neville	3 F.Amb.	K.I.A.	Gallipoli	3. 5.15

6313	Pte.	CALLINAN, William Lewis	6 F.Amb.	K.I.A.	France	5. 8.16
3259	Pte.	CALLON, John	15 F.Amb.	D.O.W.	Belgium	27. 9.17
4353	Pte.	CAMERON, Graham (M.M.)	10 F.Amb.	D.O.W.	France	17. 9.18
14478	Pte.	CAMPBELL, Charles Douglas	14 F.Amb.	D.O.W.	Belgium	23. 9.17
4910	Pte.	CAMPBELL, James	2 F.Amb.	K.I.A.	France	5. 5.17
	Pte.	CAMPBELL, Robert Ferguson	A.A.M.C.	D.O.I.	Queensland	28.10.16
	Capt.	CAMPBELL, Sydney James	A.A.M.C.	D.O.W.	Gallipoli	14. 7.15
14480	Pte.	CANE, Marchant	11 F.Amb.	D.O.W.	Belgium	7.11.17
585	Cpl.	CARNEY, Frederic Michael	4 L.H.F.Amb.	K.I.A.	Palestine	1.11.17
5505	Pte.	CARROLL, John Bede	5 F.Amb.	D.O.W.	France	22.11.16
8278	Pte.	CHADWICK, Ralph Charlton	11 F.Amb.	K.I.A.	Belgium	7. 6.17
16135	Pte.	CHALLIS, Norman Allan	4 L.H.F.Amb.	K.I.A.	Palestine	1.11.17
16181	Pte.	CHALMERS, James McDonald	10 F.Amb.	K.I.A.	France	29. 9.18
3383	Pte.	CHAMBERLAIN, Frederick Reeve (M.M.)	12 F.Amb.	K.I.A.	France	10. 7.18
1348	Pte.	CHANDLER, Arthur	1 F.Amb.	K.I.A.	France	3. 3.17
14656	Pte.	CHANDLER, Harold Stanley	13 F.Amb.	K.I.A.	Belgium	26. 9.17
	Hon. Lieut.	CHAPMAN, Alick Atkinson	12 F.Amb.	D.O.W.	France	27. 1.17
1630	Pte.	CHAPMAN, Alfred George	Attached 43 Bn	D.O.I.	France	18. 4.18
10052	Pte.	CHAPMAN, William Joseph	14 F.Amb.	K.I.A.	Belgium	21. 9.17
7987	Pte.	CHAPPELL, John	3 F.Amb.	D.O.W.	France	10. 5.17
	Pte.	CHEGWIDDEN, Victor Leopold	A.A.M.C.	D.O.I.	France	6. 2.17
4478	Pte.	CHERIGHAN, Santo	A.A.M.C. Details	D.O.C.	Australia	21. 2.18
1003	Sgt.	CHISHOLM, William Bryan	4 F.Amb.	K.I.A.	France	6. 5.17
9993	Pte.	CHISNALL, William	13 F.Amb.	K.I.A.	Belgium	14. 9.17
	Major	CLARKE, Gother Robert Carlisle	R.M.O., 34 Bn.	K.I.A.	Belgium	12.10.17
8972	Pte.	CLARKE, John	A.A.M.C.	D.O.I.	England	16.11.16
2031	Pte.	CLARKE, John Joseph	2 F.Amb.	D.O.W.	Gallipoli	8. 8.15
18638	Pte.	CLARKSON, Alban Leigh	9 F.Amb.	K.I.A.	France	31. 8.18
8236	Pte.	CLAY, Stanley James	14 F.Amb.	D.O.W.	Belgium	21. 9.17
8516	Pte.	CLIFFORD, Edward	1 F.Amb.	K.I.A.	France	29. 4.18
2967	Pte.	COE, Alec (M.M.)	5 F.Amb.	D.O.W.	Belgium	25. 9.17
4689	Pte.	COLEMAN, John	10 F.Amb.	D.O.W.	Belgium	23. 8.18
6619	Pte.	CONNELL, Joseph Ignatius	8 F.Amb.	D.O.W.	Belgium	26.10.17
9006	Pte.	CONNOLLY, Eugene John	5 F.Amb.	K.I.A.	France	4. 5.17
8995	Pte.	CONNOR, Albert Leslie	4 F.Amb.	K.I.A.	Belgium	20.10.17

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
13761	Pte.	COOK, John (M.M.)	3 F.Amb.	K.I.A.	France	11. 8.18
66196	Pte. L./Cpl.	CORE, Edward Clarence	A.A.M.C.	D.O.I.	England	9. 3.19
3375	Pte.	COURTIS, George Gordon (M.M.)	7 F.Amb.	K.I.A.	France	4. 7.18
11935	Pte.	COX, Joseph Cornelius	9 F.Amb.	K.I.A.	France	22. 7.17
16263	Pte.	Cox, John Philip	9 F.Amb.	D.O.W.	France	5. 4.18
1721	Pte.	CRAMB, William Arthur	7 F.Amb.	K.I.A.	France	26. 8.16
12268	Pte.	CRIVEN, George Edward	10 F.Amb.	D.O.W.	Belgium	4. 6.17
15046	S./Sgt.	CRAWFORD, John Alfred Eric	A.A.M.C.	D.O.I.	At Sea	16. 9.16
12455	Pte.	CRAWFORD, Quintin Cumming	10 F.Amb.	K.I.A.	Belgium	16. 7.17
2262	Pte.	CRISP, Edward Francis	6 F.Amb.	D.O.W.	France	5.10.18
11881	Sgt.	CROOK, Samuel Richard (M.M.)	9 F.Amb.	K.I.A.	Belgium	13.10.17
8896	Pte.	CULLEY, Charles	9 F.Amb.	K.I.A.	Belgium	4.10.17
6298	Pte.	CUNNINGHAM, James	1 F.Amb.	K.I.A.	France	17. 8.16
9903	Sgt.	CUNNINGHAM, John William	7 F.Amb.	D.O.I.	England	7. 2.19
1855	Pte.	CURTIS, Augustus Keighran	4 F.Amb.	D.O.I.	France	4. 9.18
4364	Pte.	CUSH, Francis Vincent	4 F.Amb.	K.I.A.	Belgium	8. 6.17
1710	Pte.	DALEY, Herbert H.	15 F.Amb.	K.I.A.	Belgium	20. 9.17
2662	Pte.	DANIEL, Stanley Norman Vivian	Attached 25 Bn.	K.I.A.	France	25.11.16
16826	S./Sgt.	DANKER, Eric Leslie Salisbury	2 F.Amb.	K.I.A.	France	17. 4.18
3157	L./Cpl. Capt.	DAVIDSON, Richard	6 F.Amb.	K.I.A.	Gallipoli	21.11.15
172	S./Sgt.	DAVIE, James	1 F.Amb.	D.O.W.	Belgium	6.10.17
8736	Pte.	DAVINET, Charles Beauchamp	3 L.H.F.Amb.	D.O.I.	Egypt	31. 5.19
1035	Pte.	DAVIS, Cecil Frederick Henry	5 F.Amb.	K.I.A.	France	1. 5.17
13675	Pte.	DAWES, Cyril Clive	Attached 40 Bn.	D.O.W.	Belgium	6.12.17
	Pte.	DEAN, Sidney Alfred	12 F.Amb.	K.I.A.	France	7. 8.16
	Capt.	DEANE, Edward Wilkinson	1 A.G.H.	D.O.I.	Egypt	4. 4.16
82	Pte.	DENSLEY, Benjamin	2 F.Amb.	D.O.W.	Gallipoli	17. 6.15
12104	Pte.	DENVER, Ralph	9 F.Amb.	K.I.A.	Belgium	12.12.17
	Capt.	DERAVIN, Francis Arthur	A.A.M.C.	D.O.I.	England	8. 7.17
15	Sgt.	DERBYSHIRE, Charles Stanley	3 F.Amb.	K.I.A.	Belgium	8.10.17
183	Pte.	DINSDALE, John Charles	3 F.Amb.	D.O.I.	Egypt	18. 2.15
3548	Sgt.	DIPROSE, Ernest	2 L.H.F.Amb.	D.O.C.	Syria	27. 9.18
13763	Pte.	Dix, Quentin William	12 F.Amb.	K.I.A.	France	2. 4.18

17085	Pte.	DOBBS, Daryl Wilson	1 F.Amb.	K.I.A.	Belgium	4.10.17
1127	W.O. II	DOBSON, Claude Edwin	A.A.M.C.	D.O.I.	England	6. 2.10
21472	Pte.	DOBSON, Walter Leeds	A.A.M.C.	D.O.I.	At Sea	23. 8.18
4376	Pte.	DOCKER, Henry	6 F.Amb.	D.O.W.	Belgium	4.10.17
13436	Pte.	DODD, Robert Alexander	5 F.Amb.	K.I.A.	France	27. 8.16
3640	Dvr.	DOLAN, William Percival	7 F.Amb.	D.O.W.	Belgium	24.10.17
996	Pte.	DONALD, Edward	4 F.Amb.	D.O.W.	Gallipoli	1. 5.15
3145	Lieut.	DOUBLEDAY, Jack Lindsay	Dental Service	D.O.I.	At Sea	30.10.18
9906	Pte.	DOUGLAS, Arthur Albert	6 F.Amb.	D.O.W.	Gallipoli	25.12.15
86	L./Cpl.	DOWNTIE, James	1 F.Amb.	K.I.A.	Belgium	18. 9.17
	Dvr.	DOWSETT, Robert William (M.M.)	2 F.Amb.	K.I.A.	France	17. 4.18
10063	Pte.	DOYLE, Matthew	8 F.Amb.	D.O.W.	Belgium	25. 9.17
15800	Pte.	DOYLE, William Samuel Hall	15 F.Amb.	D.O.W.	France	28. 5.18
16812	Pte.	DREW, David Gordon	13 F.Amb.	D.O.W.	Belgium	15.10.17
6351	Dvr.	DREW, Donald Keith Reece	14 F.Amb.	K.I.A.	France	9. 5.17
88	Pte.	DRYSDALE, William Willis	2 F.Amb.	D.O.W.	Gallipoli	21. 5.15
6423	Pte.	DUBRICICH, Frank Martin	4 F.Amb.	K.I.A.	Belgium	20.10.17
12997	Pte.	DUGGAN, John Joseph	9 F.Amb.	D.O.W.	Belgium	14.10.17
171	Pte.	DUNCAN, Wallace Bruce	2 F.Amb.	K.I.A.	France	17. 4.18
11056	L./Sgt.	DYER, Augustine Edward	9 F.Amb.	K.I.A.	France	8. 4.17
829	Sgt.	DYER, William Percival	9 F.Amb.	K.I.A.	France	4. 5.17
13284	Pte.	DYSON, Eric Artlett	3 L.H.F.Amb.	K.I.A.	France	26. 7.16
221	Pte.	ECCLES, Alfred	13 F.Amb.	D.O.W.	France	25. 4.15
4459	Pte.	EDSER, Charles Osmond Donovan	3 F.Amb.	K.I.A.	Gallipoli	12.10.17
21852	S./Sgt.	EDWARDS, Percy George	9 F.Amb.	D.O.I.	At Sea	1.12.18
3623	S./Sgt.	EGGLETON, Stanley Rumball	A.A.M.C.	D.O.W.	Belgium	8.10.17
6714	Pte.	ELDRIDGE, James Herbert	7 F.Amb.	K.I.A.	France	8. 9.17
3073	Pte.	ELLIOTT, Gordon	8 F.Amb.	K.I.A.	France	6. 5.18
29	L./Cpl.	ELLIOTT, Andrew	Attached 25 Bn.	K.I.A.	France	17. 8.16
4767	Pte.	ELLIOTT, Ernest Robert	1 F.Amb.	K.I.A.	France	9. 9.18
	Capt.	ELLIOTT, George Stephenson (M.C.)	Attached 10 Bn.	D.O.C.	England	25. 9.17
165	Sgt.	ELLIOTT, Percy Roy	R.M.O., 56 Bn.	K.I.A.	Belgium	11.11.16
3252	Sgt.	ELLIS, Edward (M.M.)	3 F.Amb.	K.I.A.	France	28. 9.17
6927	Pte.	ELLIS, Hartley Edwin	6 F.Amb.	D.O.W.	Belgium	9. 1.16
16128	Pte.	ELMS, Joseph William	8 F.Amb.	D.O.I.	Egypt	21-22. 4.17

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
3332	Pte.	EMMETT, Ernest	Attached 49 Bn.	D.O.W.	Belgium	27. 9.17
5512	Pte.	ESDAILE, Edwin Augustus	4 F.Amb.	K.I.A.	Belgium	21.10.17
3182	Pte.	ETHEREDGE, William Walter	6 F.Amb.	K.I.A.	Belgium	27. 9.17
11059	Pte.	FARQUHAR, Norman Campion	9 F.Amb.	D.O.W.	Belgium	16.10.17
2252	Pte.	FENNELL, Percy Edward Roy	3 F.Amb.	D.O.C.	At Sea	30. 3.16
14808	Pte.	FENTON, Joshua Haddon	15 F.Amb.	D.O.W.	France	1. 5.18
3185	Pte.	FINNIS, George Elliott,	6 F.Amb.	D.O.I.	Egypt	27. 1.16
3753	Pte.	FISH, Charles Vivian	Attached 8 Bn.	D.O.W.	France	17. 4.18
99	Sgt.	FISH, George Melrose	2 F.Amb.	D.O.W.	France	1. 8.16
	Lt.-Col.	FLASHMAN, James Froude	A.A.M.C.	D.O.I.	France	12. 2.17
55	L./Cpl.	FLEISCHMANN, Henry Arthur (D.C.M.)	14 F.Amb.	D.O.W.	France	21. 6.18
85	L./Cpl.	FLEMING, Arthur Rudolph	1 F.Amb.	D.O.W.	France	5.11.16
187	Pte.	FLOWERS, Fred	1 F.Amb.	K.I.A.	Belgium	18. 9.17
311	S/Sgt.	FLOYD, Lawrence Leslie	4 L.H.F.Amb.	D.O.I.	Palestine	8. 3.18
9517	L./Cpl.	FOOKS, Archibald James	1 A.G.H.	D.O.I.	England	16. 6.17
8064	Pte.	FORD, Owen Clay	2 A.G.H.	D.O.I.	France	27. 4.17
6859	Dvr.	FOSTER, John Ernest	15 F.Amb.	K.I.A.	France	10. 8.18
2201	Cpl.	FOSTER, Thomas Charles	A.A.M.C.	D.O.I.	England	22. 6.16
2702	Pte.	FOULIS, Cecil Matthew	4 L.H.F.Amb.	D.O.I.	Egypt	20. 8.15
	Capt.	FOX, Alfred Raymond	A.A.M.C.	D.O.I.	France	24. 8.18
11060	Pte.	FOX, Bernard	9 F.Amb.	K.I.A.	Belgium	12.10.17
13287	Pte.	FRANCIS, Antonia Robert (M.M.)	12 F.Amb.	D.O.W.	France	6. 9.16
2081	Pte.	FRASER, Frank Percival	2 F.Amb.	D.O.I.	England	14.11.18
12295	Pte.	FRASER, William Arthur	10 F.Amb.	K.I.A.	France	11. 8.18
	Major	FRIZELL, Thomas James	1 F.Amb.	D.O.W.	Belgium	2.12.17
20126	Pte.	FUGE, John Leslie	A.A.M.C.	D.O.I.	At Sea	12.12.18
1672	Pte.	FULLER, Alan Somerset Orde	3 F.Amb.	K.I.A.	France	19. 8.16
1131	Pte.	FULLER, Charles Alan	A.A.M.C.	D.O.W.	Galipoli	4.12.15
16225	Pte.	FULLER, Reginald George Makepeace	4 F.Amb.	K.I.A.	Belgium	8. 6.17
3505	Pte.	GALLANTY, Jean Louis Michel (M.M.)	7 F.Amb.	K.I.A.	France	5. 5.17
690	Pte.	GANNON, William James	2 F.Amb.	D.O.W.	France	5. 5.17
	Major	GARNETT, Wade Shelton	R.M.O., 45 Bn.	D.O.W.	France	15. 4.18

6717	Pte.	GEDWILLO, Alexander	8 F.Amb.	K.I.A.	France	22.12.16
10002	Capt.	GETTING, George Alexander	5 F.Amb.	D.O.W.	Belgium	18.10.17
		GIBSON, Benjamin Digby	R.M.O., 9 Rgt.	D.O.C.	Sinai Peninsula	14.1.17
188	Pte.	GILL, Frank Morley	3 F.Amb.	K.I.A.	Gallipoli	22.8.15
2858	L./Cpl.	GILLIANDERS, Henry	5 F.Amb.	K.I.A.	France	22.12.16
1055	Pte.	GILLET, Arthur Samuel Thomas	4 F.Amb.	K.I.A.	Gallipoli	15.6.15
14573	Pte.	GILLIGAN, William Robert	10 F.Amb.	D.O.W.	Belgium	20.10.17
126	Pte.	GILLMAN, Joseph	4 F.Amb.	K.I.A.	Belgium	21.10.17
17534	Pte.	GLEESON, Maurice	1 F.Amb.	D.O.W.	France	14.4.18
14009	Pte.	GODLKE, Oscar Leonard	9 F.Amb.	D.O.W.	Belgium	7.6.17
3769	Pte.	Good, Franklin Huon	13 F.Amb.	K.I.A.	Belgium	8.6.17
1057	S/Sgt.	GORDON, James Leslie	4 F.Amb.	K.I.A.	Gallipoli	24.7.15
3599	Pte.	GORDON, Lionel Leonard	A.A.M.C.	D.O.I.	Egypt	24.7.17
9469	Pte.	GORDON, Thomas Rantin	1 L.H.F.Amb.	D.O.W.	Palestine	16.11.17
16110	Pte.	GOULDING, Patrick Joseph	11 F.Amb.	D.O.W.	Belgium	17.10.17
13407	Pte.	GOWER, Max Walter	A.A.M.C.	K.I.A.	France	24.11.16
6373	Cpl.	GRAHAM, Arthur James	14 F.Amb.	D.O.W.	Belgium	28.3.18
16694	Pte.	GRAHAM, Arthur John	13 F.Amb.	K.I.A.	France	25.4.18
12307	Pte.	GRAHAM, Melville Adrian	10 F.Amb.	D.O.I.	England	9.3.17
	Capt.	GRAHAM, Stuart Millard	1 F.Amb.	D.O.W.	France	22.8.16
21748	Pte.	GRANT, George Ferguson	A.A.M.C.	D.O.I.	England	25.2.19
	Lieut.	GRANT, George Gordon	A.A.M.C.	D.O.I.	Palestine	31.8.18
10221	Pte.	GRAY, David Rodger	5 F.Amb.	K.I.A.	Belgium	29.9.17
2552	Capt.	GRAY, Oberlin Herbert	3 F.Amb.	D.O.W.	France	24.8.18
	Pte.	GREEN, Harry Franklyn	A.A.M.C.	D.O.W.	Gallipoli	29.11.15
1207	Pte.	GREENBURY, Stanley	11 F.Amb.	K.I.A.	France	2.10.18
	Major	GRIFFITH, Henry Hunter	A.A.M.C.	D.O.I.	England	22.3.19
3188	Pte.	GRIMWADE, George Risdon	6 F.Amb.	K.I.A.	Gallipoli	23.9.15
12458	L./Cpl.	GROAT, John Leonard (M.M.)	10 F.Amb.	K.I.A.	Belgium	16.10.17
12552	Pte.	GROVE, Alexander George	10 F.Amb.	D.O.C.	France	14.5.18
10032	Pte.	GULLICK, Roland Clarke	14 F.Amb.	D.O.W.	France	6.5.17
9	Sgt.	GUNN, William	3 F.Amb.	K.I.A.	Gallipoli	24.11.15
180	Pte.	GUTHRIE, Malcolm Edward Percy	1 F.Amb.	D.O.I.	Gallipoli	16.11.15
1347	L./Cpl.	HADLOW, Edmund Arthur	4 F.Amb.	K.I.A.	France	8.8.18
	Capt.	HAINS, Clarence Cecil	A.A.M.C.	D.O.C.	Belgium	14.4.19

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
3773	Pte.	HALE, Edward Godfrey	7 F.Amb.	K.I.A.	Gallipoli	25.10.15
1346	L./Cpl.	HALEY, Henry George	4 F.Amb.	D.O.I.	Egypt	1. 9.15
6514	Pte.	HALL, Clifford	13 F.Amb.	K.I.A.	Belgium	21.10.17
18923	Pte.	HAMILTON, Peter	4 L.H.F.Amb.	D.O.C.	Belgium	15. 5.19
	Capt.	HAMMOND, Kendall	R.M.O., 25 Bn.	D.O.W.	Egypt	30. 1.16
37	Pte.	HAMPSON, Herbert Albert (M.M.)	3 F.Amb.	K.I.A.	France	25. 8.18
17412	Pte.	HANGKEL, Arthur Edmund	11 F.Amb.	D.O.W.	France	8. 8.18
9035	Pte.	HANLOW, William Francis	12 F.Amb.	D.O.W.	France	3. 4.18
941	L./Cpl.	HANSEN, Rasmus Robinson	3 L.H.F.Amb.	K.I.A.	Gallipoli	7. 8.15
5478	Pte.	HANSON, Lionel Bernard	14 F.Amb.	K.I.A.	France	30. 9.18
30	Pte.	HANSON, Rupert George (M.M.)	4 F.Amb.	K.I.A.	France	16. 8.18
	Capt.	HARKNESS, Edward	A.A.M.C.	D.O.I.	Victoria	2. 8.17
12324	Pte.	HARRIS, Alfred	10 F.Amb.	K.I.A.	Belgium	4.10.17
16423	Pte.	HARRIS, Arthur Robert	No. 1 H.S.	D.O.I.	New South Wales	27. 3.18
8407	Pte.	HARRISON, Jacob	5 F.Amb.	D.O.W.	France	15.11.16
8915	Pte.	HASKINS, John Bower	8 F.Amb.	K.I.A.	Belgium	22. 8.17
9134	Pte.	HASLAM, Harold Walter Thomas (M.M.)	2 F.Amb.	K.I.A.	Belgium	20.10.17
	Capt.	HAYES, T. F.	A.A.M.C. (A.N. and M.E.F.)	D.O.I.	Australia	10.12.17
11981	Pte.	HAYNES, Frank Jefferson	9 F.Amb.	D.O.I.	France	6.10.18
1135	Pte.	HAYWARD, George Leslie	1 A.S.H.	D.O.W.	Gallipoli	4.12.15
30	Pte.	HAZLETT, James Holmes	3 F.Amb.	K.I.A.	Gallipoli	9. 8.15
9838	Pte.	HEALY, Seymour Aiviss	7 F.Amb.	K.I.A.	France	3. 5.17
	Col.	HEARNE, William Weston (D.S.O., Italian Order of St. Maurice and St. Lazarus Cavalier)	A.D.M.S., 5 Aust. Div.	K.I.A.	Belgium	17.10.17
6125	W.O. II	HEDGER, Henry Victor	Aust. Cml. Cps.	D.O.I.	Egypt	25.11.18
	Capt.	HENDERSON, Ronald Lennox (M.C.)	R.M.O., 2 Bn.	D.O.W.	France	31. 7.17
3772	Pte.	HENEHAN, John Thomas	14 F.Amb.	K.I.A.	Belgium	22. 3.18
8282	Pte.	HEWISH, Ernest Duncan	6 F.Amb.	K.I.A.	Belgium	4.10.17
20383	Pte.	HIGGINBOTHAM, James Hensley	9 F.Amb.	K.I.A.	Belgium	1.10.17

10287	Pte.	HIGGS, James Godfrey	5 F.Amb.	K.I.A.	France	26. 8.16
108	L./Cpl.	HILL, George Thomas	1 F.Amb.	D.O.W.	Gallipoli	16. 7.15
16410	Pte.	HILLCOAT, William George Vincent	3 F.Amb.	D.O.W.	Belgium	20. 9.17
10182	L./Cpl.	HILLS, George Henry (M.M.)	8 F.Amb.	K.I.A.	France	20. 9.18
7962	Pte.	HINE, Harold Leslie	1 F.Amb.	K.I.A.	Belgium	6.11.17
2423	Pte.	HOARE, Robert	12 F.Amb.	K.I.A.	France	12. 8.16
17946	Pte.	HODGES, Roy George	5 F.Amb.	K.I.A.	France	1. 9.18
2615	Pte.	HOGAN, John	4 L.H.F.Amb.	D.O.I.	Palestine	21.10.18
467	Dvr.	HOLLIDGE, Charles	2 L.H.F.Amb.	K.I.A.	Sinai Peninsula	4. 8.16
3593	Dvr.	HOMER, Harry Raymond	7 F.Amb.	D.O.I.	Gallipoli	12.11.15
4922	Major	HONMAN, Andrew Victor	R.M.O., 37 Bn.	D.O.W.	Belgium	20. 5.17
6860	Cpl.	HOOKWAY, Charles Neville	1 A.G.H.	K.I.A.	Belgium	20. 9.17
8868	Dvr.	HOPKINS, Alfred John	15 F.Amb.	D.O.W.	France	2.11.16
11878	Pte.	HORNBY, Harold Walter	15 F.Amb.	D.O.W.	France	15. 5.17
4399	S./Sgt.	HOSKING, John Matthew	9 F.Amb.	D.O.W.	Belgium	7. 6.17
	Pte.	HOWARTH, Lionel Reginald	8 F.Amb.	K.I.A.	France	4. 5.18
	Pte.	HOWELL, Ernest	2 L.H.F.Amb.	D.O.I.	Queensland	14.12.14
229	Dvr.	HUDSON, Frank	3 F.Amb.	K.I.A.	Gallipoli	25. 4.15
606	Lieut.	HUER, Frank Pearce Yarrington	Dental Service	D.O.I.	England	3. 2.19
9719	Pte.	HUGHES, Edward Patrick	1 F.Amb.	D.O.C.	Victoria	14. 6.15
	Pte.	HUGHES, Francis Henry	9 F.Amb.	K.I.A.	Belgium	12.10.17
	Capt.	HUGHES, Melville Rule	R.M.O., 59 Bn.	K.I.A.	France	20. 3.17
	Capt.	HUGHES, Roger Forrest	1 F.Amb.	D.O.W.	France	11.12.16
1286	Pte.	HULL, Joseph	4 F.Amb.	D.O.W.	Belgium	29. 9.17
2680	Pte.	HUMPHREYS, William	13 F.Amb.	D.O.I.	France	23. 1.17
816	Pte.	HUNT, Arthur George	3 L.H.F.Amb.	K.I.A.	Gallipoli	7. 8.15
202	Pte.	HUNT, Arnold Leigh	5 F.Amb.	D.O.W.	France	25. 6.17
	Major	HUNT, Gladstone Montague (M.C.)	1 F.Amb.	K.I.A.	Belgium	4.10.17
5423	Pte.	HUNTER, Foster	2 F.Amb.	D.O.W.	Belgium	27. 9.17
1317	Pte.	HUNTER, James Blakeley	Attached 39 Bn.	D.O.C.	France	19. 7.18
3819	Pte.	HUSBAND, Adrian Edmund	7 F.Amb.	D.O.I.	Gallipoli	12. 7.16
13791	Pte.	HUSSEY, George Forbes	3 A.G.H.	D.O.I.	France	21. 4.17
4196	Pte.	HUTHWAITE, Vincent Roy	Attached 3 Bn.	K.I.A.	France	3. 4.18
3149	Pte.	L'ANSON, George Reginald	15 F.Amb.	K.I.A.	Belgium	24. 9.17
13795	Pte.	INGRAM, Robert Charles	14 F.Amb.	D.O.W.	Belgium	26. 9.17

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
4226	Pte.	IRELAND, Charles Jonas Hortin	2 F.Amb.	K.I.A.	France	26. 7.16
134	L./Cpl.	JACK, Alexander Joseph	2 F.Amb.	K.I.A.	France	5. 5.17
19548	Pte.	JACKSON, Albert	A.A.M.C.	D.O.I.	England	24.11.18
136	Pte.	JAMES, Ernest (stated to be MARTIN, Ernest James)	14 F.Amb.	D.O.I.	France	28. 4.17
1094	Pte.	JAMES, Jonathan Albert	4 F.Amb.	D.O.W.	Gallipoli	6. 5.15
3308	Pte.	JAMES, William Charles	12 F.Amb.	K.I.A.	France	29. 7.16
	Major	JAMIESON, Douglas Dunbar (M.C.)	R.M.O., 8 Rgt.	D.O.C.	Egypt	29. 7.18
16712	Pte.	JAMIESON, John Malcolm	3 L.H.F.Amb.	K.I.A.	Palestine	21. 5.18
9950	Pte.	JARMAN, Stanley Derrick	7 F.Amb.	D.O.W.	France	5. 5.17
11094	L./Cpl.	JARVIS, Russell Thompson Sydney (M.M.)	9 F.Amb.	K.I.A.	Belgium	4.10.17
8965	Pte.	JENNINGS, Arthur Ernest	10 F.Amb.	D.O.W.	France	21. 5.18
3189	Pte.	JOHNS, William Thomas	6 F.Amb.	K.I.A.	Gallipoli	12.11.15
	Major	JOHNSON, Frederick Miller	6 F.Amb.	K.I.A.	Gallipoli	29.11.15
3005	Sgt.	JOHNSON, Walter Richmond Buchanan	15 F.Amb.	D.O.I.	France	20.11.18
9446	Pte.	JOHNSTON, Andrew David	A.A.M.C.	D.O.I.	England	10. 2.17
3654	Sgt.	JOHNSTON, Henry James	9 F.Amb.	D.O.I.	England	9. 2.19
717	Pte.	JOHNSTONE, Arthur Bernard	1 F.Amb.	K.I.A.	France	23. 7.16
1754	Pte.	JONES, Clarence Walter	1 F.Amb.	D.O.I.	Egypt	5. 5.15
320	Sgt.	JONES, Ernest Herbert	Attached Artillery H.Q.	K.I.A.	France	3. 9.16
806	Pte.	JONES, Kenneth Crossley	3 L.H.F.Amb.	D.O.I.	Gallipoli	30.10.15
8894	Pte.	JONES, Oscar Harold	13 F.Amb.	D.O.I.	France	23. 6.18
9447	Pte.	JONES, Richard William	13 F.Amb.	K.I.A.	Belgium	21.10.17
15802	Pte.	JONES, Arthur Alfred Alexander	15 F.Amb.	K.I.A.	Belgium	2.10.17
6555	Pte.	KEATING, William	14 F.Amb.	D.O.W.	Belgium	21. 9.17
338	Pte.	KEDDELL, George Michael	Attached 14 Bn.	K.I.A.	France	8. 8.18
12868	Pte.	KENNEDY, Sidney Clarence	11 F.Amb.	K.I.A.	Belgium	4.10.17
1646	Sgt.	KENNETT, Albert Edward	1 A.G.H.	D.O.I.	France	31.12.16
3353	Pte.	KENNEY, William Harold	6 F.Amb.	D.O.W.	Gallipoli	10.10.15

1	Capt.	KERR, Eric John	11 F.Amb.	K.I.A.	Belgium	4.10.17
2437	Sgt.	KIERNAN, Albert Arthur	1 L.H.F.Amb.	D.O.W.	Gallipoli	11. 8.15
9024	L./Sgt.	KILMARTIN, Thomas Gerald	12 F.Amb.	K.I.A.	France	7. 4.17
175	Pte.	KING, Herbert Selby	6 F.Amb.	K.I.A.	France	4. 5.17
	Pte.	KING, Leslie William (M.M.)	13 F.Amb.	D.O.W.	France	25. 4.18
	Capt.	KIRKLAND, Hugh Edward (M.C.)	R.M.O., 2 F.A. Bde.	K.I.A.	France	3.10.18
	Major	KIRKLAND, William Duncan (M.C.)	R.M.O., 2 F.A. Bde.	K.I.A.	Belgium	22. 7.17
15818	Pte.	KNIGHT, Alfred Leonard Shipley	9 F.Amb.	K.I.A.	France	20. 7.18
	Pte.	KNIGHT, Norman Dunstan	9 F.Amb.	D.O.C.	New South Wales	11. 4.16
15220	Pte.	KNOX, Robert Gordon Duncan	14 A.G.H.	D.O.C.	Egypt	25.12.16
3676	Pte.	KOSTER, Frank Roy	7 F.Amb.	D.O.I.	France	24. 4.16
12334	Pte.	KRAUSE, Leslie Norman	10 F.Amb.	K.I.A.	Belgium	22. 7.17
15221	Pte.	LAKE, Sydney Moor	4 L.H.F.Amb.	K.I.A.	Palestine	1.11.17
6367	Pte.	LAKE, Yexley Lionel	5 F.Amb.	K.I.A.	Belgium	28. 7.17
8077	Pte.	LAMBETH, Harley Charles	11 F.Amb.	D.O.W.	Belgium	18.10.17
4026	Pte.	LARSEN, Harold Leslie (M.M.)	3 F.Amb.	K.I.A.	Belgium	9.11.17
148	Pte.	LATIMER, George Edward	2 F.Amb.	K.I.A.	Gallipoli	28. 6.15
230	Dvr.	LAUGHER, William	13 F.Amb.	D.O.C.	France	6. 1.18
113	Pte.	LEACH, Arnold	9 F.Amb.	D.O.C.	Belgium	11. 1.17
14718	Pte.	LEASK, John	1 F.Amb.	K.I.A.	France	4. 5.17
6202	L./Cpl.	LEHANE, Peter Harold	1 F.Amb.	K.I.A.	France	17. 8.16
2939	Pte.	LEISHMAN, Cyril Thomas	5 F.Amb.	D.O.I.	Gallipoli	12.10.15
	Capt.	LEVI, Keith Maurice	A.A.M.C.	K.I.A.	Gallipoli	7. 8.15
16645	Pte.	LEVIN, Harold Gordon	1 F.Amb.	K.I.A.	Belgium	4.10.17
15535	Pte.	LEVY, Roy Lenard	1 F.Amb.	D.O.W.	France	8. 3.18
40	Pte.	LEWIS, Augustus Hubert Neville	A.A.M.C.	D.O.I.	England	27. 4.17
8844	L./Cpl.	LINDSAY, Alexander	14 F.Amb.	D.O.W.	Belgium	25. 9.17
	Capt.	LISTER, Charles Roy	A.A.M.C.	D.O.I.	France	21.11.18
74	Pte.	LOCHRIN, Alfred	1 F.Amb.	D.O.I.	France	12. 2.17
4287	Pte.	LOCK, Frederick Coleman	3 F.Amb.	K.I.A.	France	4. 5.17
17562	Pte.	LOCKWOOD, Leonard Allen	6 F.Amb.	D.O.W.	Belgium	10.10.17
6348	Pte.	LOCKYER, James Edward Alfred	3 A.A.H.	D.O.I.	England	6.11.18
2806	Pte.	LOCKYER, William	13 F.Amb.	K.I.A.	France	9. 8.16

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
3561	Pte.	LOGAN, Robert	7 F.Amb.	D.O.W.	France	4. 8.16
17822	Pte.	LONGSHAW, Arthur Francis	6 F.Amb.	K.I.A.	France	11. 6.18
9737	Pte.	LOONE, Henry Gordon	4 F.Amb.	D.O.W.	Belgium	28. 9.17
327	Cpl.	LORD, George Gordon (M.M.)	2 F.Amb.	D.O.W.	Belgium	31. 7.17
840	Pte.	LOVEIT, Arthur Joseph	Attached 7 Engrs. F.C.	K.I.A.	France	8. 1.17
1147	Pte.	LOWE, Ernest Gordon	1 A.S.H.	K.I.A.	Gallipoli	3.12.15
9001	Pte.	LUKE, Walter Cecil	5 F.Amb.	K.I.A.	France	6. 2.17
4856	Pte.	LUTSON, George Laban	2 F.Amb.	K.I.A.	France	5. 5.17
3188	Capt.	LUTHER, John Fitzmaurice Guy	R.M.O., 15 Bn.	K.I.A.	Gallipoli	25. 8.15
711	Pte.	LYNCH, David Michael	A.A.M.C.	D.O.I.	England	20. 6.18
3980	Pte.	LYNDON, Henry William	13 F.Amb.	K.I.A.	France	14.11.16
7647	Pte.	LYONS, Frank	7 F.Amb.	D.O.C.	France	23. 3.16
	Pte.	MACDONALD, Alexander	A.A.M.C.	D.O.I.	England	8. 8.17
	Capt.	MACK, Brian Hamilton	R.M.O., 4 F.A. Bde.	K.I.A.	France	10. 4.17
16133	Capt.	MACKENZIE, John Gladstone	6 F.Amb.	K.I.A.	France	21. 5.16
1244	Pte.	MACKENZIE, Thomas	12 F.Amb.	K.I.A.	France	2. 4.18
50	Pte.	MACKIE, Michael	2 A.S.H.	D.O.I.	France	9.11.17
19	Pte.	MACKIE, Claude William	1 F.Amb.	K.I.A.	France	23. 7.16
13630	Sgt.	MACWHIRTER, William Tate	2 A.G.H.	D.O.I.	Gallipoli	6.11.15
220	Pte.	MAGUIRE, Virgil	6 F.Amb.	K.I.A.	Belgium	27. 9.17
10	Pte.	MAHER, Thomas Patrick	2 F.Amb.	D.O.W.	France	11. 8.18
15146	Pte.	MAIR, Thomas Newell	13 F.Amb.	D.O.I.	Belgium	25.10.17
3649	Pte.	MAJOR, George Stanley	14 A.G.H.	D.O.I.	Egypt	5. 6.18
8474	Pte.	MALLETT, Albert Percy	7 F.Amb.	D.O.W.	France	28. 7.16
7888	L./Cpl.	MALLYON, Herbert Thomas Moffitt	15 F.Amb.	D.O.W.	Belgium	29. 9.17
14725	Pte.	MARKS, Marcus Leslie	1 F.Amb.	K.I.A.	Belgium	4.10.17
1460	Pte.	MARLAY, Edward William Beverley	1 F.Amb.	D.O.I.	At Sea	20. 9.17
1156	Cpl.	MARSH, Alan Lindsay	1 A.G.H.	D.O.I.	Gallipoli	6. 9.15
2070	Sgt.	MARSHALL, Harold Seymour	1 A.S.H.	D.O.I.	Gallipoli	23. 7.16
85	Pte.	MARTIN, Arthur Roberts	1 A.G.H.	D.O.I.	Egypt	4. 6.16
	Pte.	MARTIN, Alexander Vernon	5 F.Amb.	K.I.A.	France	6. 5.17

15794	Pte.	MARTIN, Cyril Everard	14 F.Amb.	K.I.A.	France	5. 5.17
2276	Capt.	MATHISON, Gordon Clunes Mackay	- 2 F.Amb.	D.O.W.	Gallipoli	18. 5.15
4424	Cpl.	MATTHEWS, Rodney Norman	6 F.Amb.	K.I.A.	France	29. 7.16
4846	Pte.	MAY, Harold John	14 A.G.H.	D.O.C.	Egypt	12.11.17
2969	Pte.	MAYSTON, Malcolm Charles	14 F.Amb.	D.O.W.	France	23. 2.17
233	Pte.	McAULAY, James Clarence	5 F.Amb.	K.I.A.	Gallipoli	27. 8.15
2237	Pte.	McCABE, Harry	3 F.Amb.	D.O.I.	Egypt	14. 3.15
7768	Pte.	McCABE, James	3 A.A.H.	D.O.I.	England	24.11.18
1074	Pte.	McCLENAGHAN, James Hoy	15 F.Amb.	K.I.A.	Belgium	25. 9.17
6557	Pte.	McCREDE, Robert Burns	4 F.Amb.	D.O.W.	Gallipoli	21. 5.15
144	Cpl.	McCULLOCH, Leslie John	6 F.Amb.	D.O.I.	Belgium	1. 1.18
153	Pte.	McDONALD, Archibald	1 F.Amb.	D.O.W.	France	5. 3.17
8192	Pte.	McDONALD, Robert Skirving	2 F.Amb.	K.I.A.	Gallipoli	8. 8.15
8194	Pte.	McDOUGALL, David Merson	13 F.Amb.	K.I.A.	France	3. 9.16
409	Pte.	McDOWELL, Norman Kenneth	14 F.Amb.	D.O.W.	Belgium	21. 9.17
		McFLINN, Martin	Attached	D.O.W.	Gallipoli	23. 5.15
			A.A.S.C.			
3977	Pte.	McGOWAN, Robert	3 F.Amb.	D.O.W.	France	15. 5.17
6331	Dvr.	McGOWAN, William	3 F.Amb.	K.I.A.	Belgium	18. 9.17
44	Pte.	McGOWEN, Frank Noel	1 L.H.F.Amb.	D.O.W.	Gallipoli	24. 8.15
4246	Pte.	McGUIRE, Julian Edmond	4 F.Amb.	D.O.W.	France	26. 8.18
926	Pte.	McINDOE, Roy William	10 F.Amb.	D.O.I.	Gallipoli	16.12.15
12352	Pte.	McINTYRE, George Joseph (M.M.)	10 F.Amb.	K.I.A.	Belgium	13.10.17
1459	Sgt.	McKENZIE, Matthew Stanley	1 Aust. Cl. Hosp.	D.O.I.	Gallipoli	8.12.15
136	Dvr.	McKERNAN, Alexander	3 F.Amb.	K.I.A.	Belgium	31.10.17
30	Pte.	McLACHLAN, Archibald	1 L.H.F.Amb.	D.O.I.	Egypt	1. 6.15
12017	Pte.	McLEAN, Harold Gavin	9 F.Amb.	D.O.W.	France	9. 4.18
8788	Pte.	McLEAN, Harry Stanley (M.M.)	6 F.Amb.	D.O.W.	France	7.11.16
8196	Pte.	McNAMARA, Thomas Harold	13 F.Amb.	K.I.A.	France	27. 3.17
19000	S./Sgt.	McNAUGHTON, William	Dental Service	K.I.A.	England	12. 2.19
4027	L./Cpl.	McNEIL, London Bain	3 F.Amb.	D.O.W.	France	11.11.16
2006	Sgt.	McPHEE, Victor Alexander Douglas	4 F.Amb.	K.I.A.	France	10. 4.18
2003	Pte.	McQUILLAN, John Francis	4 F.Amb.	D.O.W.	Belgium	12.10.17
716	Pte.	McQUIRK, Francis Thomas	2 A.G.H.	D.O.C.	England	25.12.16
16082	Pte.	McWATERS, Norman Francis	11 F.Amb.	K.I.A.	Belgium	17.10.17
2603	Pte.	MEADOWS, Mervyn Charles	14 F.Amb.	D.O.W.	Belgium	16.10.17

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
5380	Pte.	MEFFERT, Godfried	A.A.M.C.	D.O.I.	England	19. 1.19
17145	Pte.	MEHAFFEY, Campbell Graham	6 F.Amb.	K.I.A.	Belgium	5.11.17
13962	Pte.	MERCER, Henry Boyd	8 F.Amb.	D.O.W.	Belgium	25. 9.17
2944	Pte.	MERRITT, Sydney Lawrence	13 F.Amb.	K.I.A.	France	26. 4.18
234	Dvr.	MERWIN, Stephen Francis	3 F.Amb.	D.O.W.	Gallipoli	21. 6.15
	Capt.	METCALFE, Francis Bramall	R.M.O., 38 Bn.	D.O.I.	Belgium	6.10.17
	Major	METCALFE, James Beverley (D.S.O., M.C.)	10 F.Amb.	D.O.W.	France	25. 4.18
4184	Pte.	MILEY, John William	5 F.Amb.	K.I.A.	France	2. 9.18
9615	Pte.	MILLER, Gordon Victor	4 F.Amb.	D.O.W.	Belgium	1.10.17
173	Sgt.	MINNIS, John Andrew	1 F.Amb.	K.I.A.	France	23. 7.16
8080	Pte.	MITCHELL, John Henry	4 F.Amb.	D.O.W.	France	8. 8.18
1724	Pte.	MOFFAT, David Livingstone	7 F.Amb.	D.O.W.	Belgium	4.10.17
13810	Pte.	MOFFAT, Mervyn Francis	A.A.M.C.	D.O.I.	England	16.10.16
21255	Capt.	MONEY, Percy Frederick	3 A.G.H.	D.O.I.	England	22.12.16
13681	Pte.	MONTGUE, Henry Alphaeus	A.A.M.C.	D.O.I.	England	3. 2.19
2318	Pte.	MOORE, Frank Gregory	8 F.Amb.	K.I.A.	Belgium	27.10.17
5383	Pte.	MOORE, Ralph Deane	6 F.Amb.	K.I.A.	Belgium	27. 9.17
63956	Pte.	MOREY, Harry Havelock (M.M.)	14 F.Amb.	K.I.A.	France	1. 9.18
169	Pte.	MORGAN, Gerald Stanley	A.A.M.C.	D.O.I.	France	25.10.18
		MORRIS, Harry Malcolm (stated to be LANG, Jack Officer)	2 F.Amb.	D.O.I.	Egypt	4 3.15
305	Pte.	MORRIS, John Henry William	1 F.Amb.	K.I.A.	Belgium	6.10.17
12349	Pte.	MUDIE, Lewis Charles (M.M.)	10 F.Amb.	K.I.A.	Belgium	13.10.17
9841	Pte.	MUNDIE, Douglas Adam	6 F.Amb.	K.I.A.	Belgium	1.11.17
17705	Pte.	MUNT, Leslie Gordon	1 F.Amb.	K.I.A.	Belgium	6.11.17
1377	Pte.	MURPHY, Cornelius Joseph	4 F.Amb.	K.I.A.	Gallipoli	9. 5.15
17045	Pte.	MURPHY, Robert Hampden	1 F.Amb.	K.I.A.	Belgium	4.10.17
7763	Pte.	MURRAY, Philip Robert	8 F.Amb.	K.I.A.	Belgium	24 9.17
3202	Pte.	MURRAY, William Herbert	6 F.Amb.	D.O.W.	Gallipoli	15.11.15
4440	Pte.	NANCARROW, Henry	12 F.Amb.	D.O.W.	France	3. 4.18
12029	L./Cpl.	NANKIVELL, Joseph Dench	9 F.Amb.	K.I.A.	Belgium	13.10.17

3523	Pte.	NEIL, John	7 F.Amb.	D.O.W.	Gallipoli	4.10.15
5284	Lt.-Col.	NICHOLAS, James Joachim	5 F.Amb.	K.I.A.	Belgium	20. 9.17
14362	Pte.	NICOLLE, Wilfred Gordon	11 F.Amb.	K.I.A.	Belgium	23.11.17
	Pte.	NIELSEN, Christian	1 F.Amb.	D.O.W.	Belgium	19. 9.17
16084	Capt.	NIVEN, John Lang	1 A.G.H.	D.O.I.	Gallipoli	26. 9.16
4754	Pte.	Nix, Joseph Clarence	1 F.Amb.	K.I.A.	Belgium	18. 9.17
6005	Pte.	NOBLE, George	8 F.Amb.	D.O.I.	England	13.11.18
1843	Dvr.	NORTH, Arthur George	1 F.Amb.	D.O.W.	France	5.11.16
		Nuss, Michael	Attached 11	D.O.C.	Palestine	10.11.17
			Regt.			
89	L./Cpl.	OAKLEY, Herbert Arthur	14 F.Amb.	D.O.I.	England	4.11.17
1674	Pte.	O'BRIEN, John Cornelius	Attached 14	K.I.A.	Belgium	20. 8.17
85953	Pte.	O'CONNOR, Thomas	Sea Trans. Sec.	D.O.I.	New South Wales	26. 6.19
12656	Pte.	O'DEA, Thomas Nelson	11 F.Amb.	D.O.W.	Belgium	9. 5.17
1256	Pte.	O'HOULIHAN, Patrick	1 F.Amb.	D.O.W.	Belgium	18. 9.17
3887	Pte.	OLSTAD, Harry	5 F.Amb.	D.O.W.	France	7. 9.18
8202	Pte.	ONLEY, Edward Roy	8 F.Amb.	D.O.W.	France	10. 8.18
103	Pte.	OWEN, Charles William	1 L.H.F.Amb.	D.O.I.	Egypt	30. 9.16
1082	Pte.	PAISH, Albert Walter	4 F.Amb.	D.O.W.	Gallipoli	12. 7.15
121	Sgt.	PARKER, Anthony	3 F.Amb.	K.I.A.	Belgium	8.10.17
1083	Pte.	PARKER, William Charles	4 F.Amb.	D.O.I.	Egypt	6. 4.15
13331	Pte.	PARKINSON, Albert Edward	2 F.Amb.	K.I.A.	France	11. 4.17
737	Pte.	PARAMORE, James Larkin	12 F.Amb.	D.O.I.	France	12.10.18
14369	Pte.	PARSONAGE, Thomas Henry	2 A.G.H.	D.O.I.	France	22. 4.17
19761	Pte.	PARSONS, Albert Edward	5 F.Amb.	D.O.I.	At Sea	2. 1.19
9373	Pte.	PARSONS, George Williams	Sea Trans. Sec.	D.O.W.	France	6. 3.17
5343	Pte.	PARSONS, Sydney Frederick	1 F.Amb.	D.O.W.	Belgium	21. 9.17
13420	Pte.	PEARCE, Lawrence Edmonds	2 F.Amb.	K.I.A.	England	1.10.16
11860	Pte.	PEARSON, John Graham	A.A.M.C.	K.I.A.	France	25. 8.18
77	Pte.	PENHALIGON, Sydney John	3 F.Amb.	D.O.W.	Gallipoli	14. 5.15
3280	Pte.	PERMAN, Arthur Herbert	3 F.Amb.	D.O.W.	France	8. 5.17
558	Pte.	PETTINGER, George Lawrence	2 L.H.F.Amb.	D.O.W.	Gallipoli	26. 5.15
12380	Pte.	PHILLIPS, James Angus	10 F.Amb.	K.I.A.	Belgium	13.10.17
10083	Pte.	PICKARD, Edward Howard (M.M. and Bar)	4 F.Amb.	D.O.W.	Belgium	4. 8.17

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
68	Pte.	PICKLES, Edwin (stated to be PICKELS, Edwin)	1 F.Amb.	D.O.I.	Egypt	25. 3.15
5386	Pte.	PILLING, Lewis James	3 F.Amb.	D.O.W.	France	23. 8.16
10453	Pte.	PILLINGER, Harry	6 F.Amb.	D.O.W.	France	7.11.16
	Capt.	PLANT, Harold Frederick Hood	R.M.O., 24 Bn.	K.I.A.	France	7. 8.16
	Capt.	POCKLEY, Brian Colden Antill	A.A.M.C. (A.N. and M.E.F.)	D.O.W.	New Britain	11. 9.14
8530	Pte.	POLLARD, Ernest Cecil	1 F.Amb.	D.O.W.	Belgium	21. 7.17
14811	Pte.	POLSON, Arthur Ernest	10 F.Amb.	D.O.W.	Belgium	10. 7.17
271	Dvr.	PONTING, Ernest Edwin	Attached 7 Bn.	D.O.W.	Belgium	23. 9.17
9842	Dvr.	PORTER, George John	2 F.Amb.	D.O.W.	Belgium	6.10.17
12047	Pte.	PORTER, Samuel Ernest	9 F.Amb.	K.I.A.	France	8. 4.17
12378	Cpl.	PORTER, Thomas Henry	10 F.Amb.	D.O.W.	France	20. 5.18
5622	Pte.	POTTER, Frederick	5 F.Amb.	K.I.A.	France	23. 4.17
5503	Pte.	POTTER, Ernest Edward	5 F.Amb.	D.O.C.	France	15.11.16
6656	L./Cpl.	POWELL, James Hugh (M.M.)	8 F.Amb.	K.I.A.	France	11. 5.18
2833	Pte.	POWER, Leslie	12 F.Amb.	K.I.A.	France	9. 8.18
3532	Dvr.	PREWETT, Victor Edward	7 F.Amb.	K.I.A.	France	26. 8.16
105	Pte.	PRICE, Thomas	1 L.H.F. Amb.	D.O.I.	Gallipoli	26. 7.15
16768	Pte.	PRITCHARD, Clement Murray	4 F.Amb.	K.I.A.	Belgium	21.10.17
9028	L./Cpl.	PROFITT, John Walter Charles	6 F.Amb.	D.O.W.	France	10.11.16
4934	Pte.	PUGH, Constantine Vincent	14 F.Amb.	K.I.A.	France	15. 5.17
1787	Pte.	PULLEN, Arthur	4 F.Amb.	D.O.W.	Belgium	26. 9.17
1807	L./Cpl.	QUIRK, Roy Gladstone (M.M.)	15 F.Amb.	D.O.W.	Belgium	26. 9.17
17708	Pte.	RABINOVITCH, Eliezer Hurst	9 F.Amb.	D.O.W.	France	31. 8.18
2011	Pte.	RAMAGE, Ernest	5 F.Amb.	K.I.A.	Gallipoli	23. 8.15
16416	Pte.	RANSLEY, Francis Henry	3 F.Amb.	K.I.A.	Belgium	31.10.17
1166	Pte.	READ, Frederick James	2 F.Amb.	D.O.I.	England	16. 1.19
18930	Pte.	REDDING, Lawrence Henry	14 A.G.H.	K.I.A.	Egypt	17.18. 3.19
6293	Pte.	REDMAN, Harold Selby	5 F.Amb.	D.O.W.	Belgium	20. 9.17
1168	Sgt.	REED, Norman Hamilton	1 F.Amb.	D.O.W.	Belgium	18. 9.17
	Hon. Lieut.	REEDER, George Thomas	A.A.M.C.	D.O.W.	Egypt	21. 2.16
12754	Pte.	REEDMAN, Arthur Sydney	11 F.Amb.	K.I.A.	Belgium	17.10.17

10204	Pte.	REID, Albert	12 F.Amb.	K.I.A.	Belgium	28.12.17
8976	S/Sgt.	REID, Charles Stuart	Dental Service	D.O.I.	France	24.11.18
3962	Pte.	REID, James Stephen	7 F.Amb.	D.O.W.	France	31. 8.16
82	L/Cpl.	RENFREE, William Edgar	3 A.G.H.	D.O.I.	England	10.11.18
13346	Pte.	RENTOUT, John William	4 F.Amb.	K.I.A.	Belgium	8. 6.17
4454	Pte.	REYNOLDS, Harry Albert	1 F.Amb.	K.I.A.	Belgium	21. 3.18
4211	Pte.	RICE, Hubert Curtis	1 F.Amb.	D.O.W.	France	10. 4.17
8100	Pte.	RICHARDS, Alfred Edgar (M.M.)	13 F.Amb.	K.I.A.	France	27. 3.17
	Major	RICHARDS, Samuel Jabez	A.A.M.C	D.O.I.	Gallipoli	21. 7.15
1703	Pte.	RIDGWAY, Edward Drayton	1 F.Amb.	D.O.W.	France	11. 8.18
11264	Pte.	RITCHIE, Joseph (M.M.)	13 F.Amb.	K.I.A.	France	18. 9.18
874	Pte.	ROBERTS, Abraham Reginald	3 L.H.F.Amb.	D.O.W.	Gallipoli	24. 8.15
	Capt.	ROBERTS, Leonard Edmund Wadsworth	R.M.O., 30 Bn.	D.O.W.	France	2. 9.18
6274	Dvr.	ROBERTS, Norman Charles Gordon	9 F.Amb.	K.I.A.	France	29. 9.18
6603	Sgt.	ROBERTS, Robert (M.M.) (stated to be LAWRENCE, Austin Sylvester)	8 F.Amb.	D.O.W.	Belgium	24.10.17
13645	Pte.	ROBERTS, Robert Allan	6 F.Amb.	D.O.W.	France	7. 4.18
6318	L./Sgt.	ROBERTSON, Frederick Norman	6 F.Amb.	K.I.A.	Belgium	28. 9.17
620	Pte.	ROBERTSON, Robert Hill	1 L.H.F.Amb.	D.O.W.	Sinai	10. 1.17
17245	Pte.	ROBERTSON, William	10 F.Amb.	D.O.W.	France	5. 4.18
6778	Pte.	ROBINSON, Edwin	8 F.Amb.	D.O.C.	Egypt	10. 6.16
194	Pte.	ROBINSON, John Henry	2 F.Amb.	D.O.W.	Gallipoli	10. 5.15
17441	Pte.	ROBINSON, Richard Herbert	10 F.Amb.	D.O.W.	France	1. 4.18
6575	Pte.	ROCHFORD, Valentine Augustine	9 F.Amb.	D.O.W.	France	23. 8.18
12842	Pte.	RODDA, William Henry	11 F.Amb.	D.O.W.	Belgium	4. 6.17
19116	Pte.	RODREA, John Edward	13 F.Amb.	D.O.I.	England	28. 2.19
6601	Sgt.	ROEUCK, Charles Clement	8 F.Amb.	D.O.C.	England	2. 9.17
13644	Pte.	ROSE, Walter	2 F.Amb.	D.O.I.	England	3.11.18
8625	Pte.	ROSENTHALL, Arthur Kingston	1 L.H.F.Amb.	K.I.A.	France	7. 8.16
50	Pte.	ROWLANDS, Cecil Rupert	Attached 1 F.A.	D.O.I.	Gallipoli	29. 5.15
323	Pte.		Bde.	D.O.I.	Gallipoli	20. 7.16
15577	Pte.	ROWLANDS, Lewis E.	6 F.Amb.	K.I.A.	France	21-22. 4.17
23	Pte.	RUDN, William	2 F.Amb.	K.I.A.	Gallipoli	20. 5.15
16237	Pte.	RUGNER, Reginald Carl	14 F.Amb.	D.O.W.	Belgium	25. 9.17

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
4527	Pte.	RUTHERFORD, Alexander Thomas	1 A.G.H.	D.O.I.	England	12.12.18
12393	Pte.	RYALL, Henry	10 F.Amb.	D.O.W.	Belgium	7. 6.17
6299	Pte.	RYAN, Thomas	1 F.Amb.	D.O.W.	Belgium	4.10.17
386	Pte.	RYE, Alfred Andrew	Attached 9 Bn.	D.O.W.	Gallipoli	10. 6.15
3373	Pte.	SADLER, Norman Henry (M.M.)	12 F.Amb.	K.I.A.	France	30. 8.16
8419	Pte.	SALES, Henry Tasman	6 F.Amb.	D.O.W.	France	6. 1.17
5369	Pte.	SANDERSON, Reginald Frederick	3 F.Amb.	D.O.I.	France	1. 3.19
3321	L./Cpl.	SANDY, John Henry (M.M.)	6 F.Amb.	K.I.A.	Belgium	20. 9.17
164	Pte.	SAUNDERS, Joseph	14 F.Amb.	D.O.W.	France	20. 5.18
2421	Pte.	SAUNDERS, William Edward	3 C.C.S.	D.O.W.	Belgium	21. 8.17
2253	Pte.	SCHMIDT, Norman Edward Johnson	4 L.H.F.Amb.	K.I.A.	Palestine	1.11.17
12761	Pte.	SCOTT, John Jory	11 F.Amb.	D.O.W.	Belgium	21.10.17
8362	Pte.	SEARLE, Frederick Morton	5 F.Amb.	K.I.A.	Belgium	29.10.17
9145	Pte.	SEELEY, Francis Charles	A.A.M.C.	D.O.I.	England	9. 6.18
2632	Pte.	SELLERS, Leslie Raymond	3 F.Amb.	K.I.A.	Belgium	1. 6.17
	Major	SETON, Miles Charles Cariston	A.A.M.C.	D.O.C.	England	13. 1.19
9767	Capt.	SEWELL, Philip Beauchamp	R.M.O., 50 Bn.	K.I.A.	France	24. 4.18
7968	Pte.	SEYMOUR, Richard Rolland	1 F.Amb.	K.I.A.	Belgium	4.10.17
5390	Pte.	SHAPLEY, Harry Gilbert	13 F.Amb.	K.I.A.	France	17.11.16
12398	Pte.	SHARP, Richard Ralph	3 F.Amb.	D.O.W.	France	7. 5.17
3584	Pte.	SHAW, Leonard Joseph	10 F.Amb.	K.I.A.	France	26. 2.17
1100	Pte.	SHAW, Stafford Atkinson	7 F.Amb.	D.O.I.	France	28.11.15
	Pte.	SHEAF, Stephen Brewster	3 F.Amb.	D.O.W.	Gallipoli	4. 5.15
	Pte.	SHEAHAN, Frank Joseph	12 F.Amb.	D.O.W.	France	18. 4.17
13186	Pte.	SHEEDY, James	12 F.Amb.	D.O.W.	France	3. 9.16
206	L./Cpl.	SHERGOLD, Reginald Beauchamp	1 F.Amb.	D.O.W.	France	16. 5.17
1437	L./Cpl.	SHERLOCK, Charles Beresford	A.A.M.C.	D.O.I.	Gallipoli	13.10.15
	Capt.	SHERLAW, Norman Craig (M.C.)	R.M.O., 13 Bn.	D.O.W.	France	11. 4.17
	Capt.	SILLAR, Roy Allen	A.A.M.C.	D.O.C.	England	30. 6.18
9769	Pte.	SILVA, Manuel Antony	1 F.Amb.	D.O.I.	England	5.12.16
14994	Pte.	SILVERMAN, Joseph	14 F.Amb.	D.O.W.	Belgium	23. 9.17
202	Pte.	SIMPSON, John stated to be Kmr-PATRICK, John Simpson)	3 F.Amb.	K.I.A.	Gallipoli	19. 5.15

205	Pte.	Sims, John	2 F.Amb.	K.I.A.	France	10. 8.16
18756	Pte.	SKINNER, Reuben Harold	A.A.M.C.	D.O.I.	England	25. 3.18
6456	Pte.	SKYRING, Lowes Henry	2 L.H.F.Amb.	D.O.I.	Asia Minor	9. 8.18.
15579	Pte.	SMART, Alfred Ernest	4 F.Amb.	(P.O.W.)	France	6. 5.17
19	Pte.	SMITH, Arthur Leonard	1 F.Amb.	K.I.A.	France	17. 8.16.
7782	L./Cpl.	SMITH, Charles Stanley (M.M.)	4 F.Amb.	K.I.A.	Belgium	25. 9.17
17706	Pte.	SMITH, Harry Walter Nunn	2 A.G.H.	D.O.I.	France	30. 3.19
16651	Pte.	SMITH, Joe	14 F.Amb.	K.I.A.	France	27. 8.18
63961	Pte.	SMITH, James Hamilton Campbell	4 F.Amb.	D.O.I.	France	12.12.18
6	Sgt.	SMITH, John Olley	1 F.Amb.	K.I.A.	Gallipoli	24.11.15
12306	Pte.	SMITH, Lancelot Cropley (M.M.)	10 F.Amb.	D.O.W.	Belgium	15.10.17
9984	Pte.	SMITH, Leslie Melrose	14 F.Amb.	D.O.W.	Belgium	23. 9.17
2016	Pte.	SMITH, Thomas William (M.M.)	14 F.Amb.	K.I.A.	France	30. 9.18
6582	Pte.	SMITH, William Henry	7 F.Amb.	K.I.A.	France	6. 8.16
1307	Cpl.	SMITH, William Patrick	4 F.Amb.	D.O.W.	Gallipoli	28. 6.15
5623	Pte.	SNASHALL, Ernest Albert (M.M.)	5 F.Amb.	K.I.A.	Belgium	18. 9.17
14497	Capt.	SOUTER, John Francis	A.A.M.C.	D.O.I.	Egypt	26. 2.16
17053	Pte.	SPENCER, Albert	10 F.Amb.	D.O.W.	France	21. 5.18
20096	Pte.	SPICER, Walter Alfred	1 F.Amb.	K.I.A.	Belgium	4.10.17
	Pte.	SPRAGUE, Arthur Thomas	Sea Trans. Sec.	D.O.I.	New South Wales	28. 6.19
179	Pte.	SPURGEON, Frederick Charles	3 F.Amb.	D.O.W.	Gallipoli	1. 6.15
15578	Pte.	STEEL, James Frederick	9 F.Amb.	K.I.A.	Belgium	18.10.17
14016	Pte.	STEVENSON, Clyde Raymond (M.M.)	12 F.Amb.	K.I.A.	France	10. 7.18
	Major	STEWART, Cedric Alwyn	1 F.Amb.	K.I.A.	France	28. 4.18
131	Sgt.	STEWART, John McDougall (D.C.M.)	2 F.Amb.	K.I.A.	France	23. 4.18
1265	Pte.	STEWART, Malcolm George	12 F.Amb.	D.O.W.	Belgium	19.10.17
1611	Pte.	STEWART, Robert	15 F.Amb.	D.O.W.	Belgium	9.10.17
15649	Pte.	STIRLING, Leslie Robert	4 F.Amb.	K.I.A.	Belgium	21.10.17
21866	S./Sgt.	STOCK, Joseph	Dental Service	D.O.I.	At Sea	6.12.18
1181	L./Cpl.	STOLZ, George Alexander	1 A.S.H.	K.I.A.	Gallipoli	3.12.15
7788	Pte.	STONE, Francis Alexander	2 F.Amb.	K.I.A.	Belgium	21. 9.17
1092	L./Cpl.	STOUT, Henry	4 F.Amb.	K.I.A.	Gallipoli	21. 8.15
14812	Pte.	STREAT, George Albert	10 F.Amb.	K.I.A.	France	29. 8.18
8232	Pte.	STREDWICK, Sydney Alfred	2 F.Amb.	D.O.W.	France	25. 7.16

Reg. No.	Rank	Name and Honours	Unit	Nature of Casualty	Place of Casualty	Date of Casualty
15104	Pte.	STRIPLING, Richard Thomas Henry	2 L.H.F.Amb.	D.O.C. (P.O.W.)	Turkey	30. 4.18
10185	Pte.	STRONG, Henry James	10 F.Amb.	D.O.W.	Belgium	22.10.17
160	Pte.	STROUT, Hubert Wallace (Croix de Guerre)	A.A.M.C.	D.O.C.	Sth. Africa	20. 9.17
9665	Pte.	STURROCK, Roland Warden Fisher	7 F.Amb.	D.O.W.	France	7. 8.16
15195	S./Sgt.	SULLIVAN, Charles Frederic	14 A.G.H.	D.O.I.	Palestine	15.11.18
1515	Pte.	SULLIVAN, Eugene	9 F.Amb.	D.O.W.	Belgium	17.10.17
6750	Pte.	SULLIVAN, Sydney John	3 A.G.H.	D.O.I.	France	14.10.18
81	L./Cpl.	SUMMERS, William Wigan	1 F.Amb.	D.O.W.	Gallipoli	28. 6.15
11892	Cpl.	SUTHERLAND, Benjamin Henry	9 F.Amb.	K.I.A.	Belgium	12.10.17
16180	Pte.	SWAN, Arthur Robert	A.A.M.C.	D.O.I.	At Sea	11. 1.17
13647	L./Cpl.	SWANSON, Hector (M.M.)	7 F.Amb.	K.I.A.	France	2. 9.18
15580	Pte.	SWETT, George	6 F.Amb.	K.I.A.	France	21-22. 4.17
17302	Pte.	SWYNY, Leslie James	5 F.Amb.	K.I.A.	France	31. 8.18
153	Pte.	SYMMONS, Joseph Henry	A.A.M.C.	D.O.I.	At Sea	24. 5.15
6063	Pte.	SYNOT, Myles Henry Walter	4 F.Amb.	K.I.A.	Belgium	27. 9.17
5300	Pte.	TAMPLING, Noel Gordon	12 F.Amb.	D.O.W.	France	20. 9.18
872	Pte.	TATTE, Sebastian (stated to be TATTI, Sebastian)	13 F.Amb.	K.I.A.	France	27. 3.17
2808	Dvr.	TAYLOR, Victor Ross	5 F.Amb.	D.O.W.	Belgium	21. 6.17
17153	Pte.	TAYLOR, William Gordon	15 F.Amb.	K.I.A.	France	8. 8.18
	Capt.	TEAGUE, Harold Oscar	R.M.O., 11 Bn.	K.I.A.	France	14. 2.17
2722	L./Cpl.	TEAL, Joseph Edward	5 F.Amb.	K.I.A.	France	3.10.18
1704	Pte.	TENCH, Thomas Wallace	2 L.H.F.Amb.	D.O.I.	Sinai	1. 9.16
3804	Sgt.	THEAKER, Norman	13 F.Amb.	D.O.I.	France	26.10.18
1354	Pte.	THOMAS, Arthur Stanley	4 F.Amb.	D.O.I.	Gallipoli	21.10.15
283	Dvr.	THOMAS, Colin	2 F.Amb.	D.O.W.	Gallipoli	13. 7.15
3282	Pte.	THOMAS, Edward Courtney	6 F.Amb.	K.I.A.	France	11.11.16
12771	Pte.	THOMAS, Horace Edward	11 F.Amb.	K.I.A.	Belgium	6. 6.17
13050	Pte.	THOMAS, Harry Ernest	6 F.Amb.	D.O.W.	Belgium	9.11.17
2093	Dvr.	THOMAS, Henry George	13 F.Amb.	D.O.I.	France	22.11.18
108	Pte.	THOMAS, William Henry	1 L.H.F.Amb.	D.O.I.	Gallipoli	12. 8.15

8615	Pte.	THOMPSON, Stanley	2 F.Amb.	K.I.A.	France	10. 8.16
1273	L./Cpl.	THOMSON, John	15 F.Amb.	K.I.A.	Belgium	13. 3.18
433	Sgt.	THOMSON, Robert Percy	2 L.H.F.Amb.	K.I.A.	Palestine	17. 4.17
14581	Pte.	THORNTON, Charles Henry	6 F.Amb.	K.I.A.	France	21-22. 4.17
10089	Pte.	THORNTON, Charles Leslie	14 F.Amb.	K.I.A.	Belgium	21. 9.17
10088	Pte.	THORNTON, Mervyn Willoughby	14 F.Amb.	D.O.I.	England	30.10.18
224	L./Cpl.	THORNTON, Raymond Slade	2 F.Amb.	D.O.W.	Gallipoli	27. 5.15
14018	L./Sgt.	THORSEN, Henry James	3 C.C.S.	D.O.W.	Belgium	22. 8.17
12	Sgt.	THRELFALL, Reginald Hope	1 L.H.F.Amb.	K.I.A.	Gallipoli	8. 8.15
20144	Pte.	THWAITES, Arthur Charles	A.A.M.C.	D.O.C.	At Sea	9.12.18
1121	Pte.	THWAITES, Thomas	6 F.Amb.	K.I.A.	France	6.11.16
14949	Pte.	TIDY, William James	6 F.Amb.	K.I.A.	France	3.10.18
1989	Pte.	TIERNEY, Joseph	2 A.A.H.	D.O.I.	France	15. 6.19
	Capt.	TILLET, John Rowland	R.M.O., 7 F.A. Bde.	D.O.W.	Belgium	2.10.17
3805	Dvr.	TOLE, Claude	13 F.Amb.	K.I.A.	France	9. 8.18
2034	Pte.	TOULMIN, Augustus Dell	4 F.Amb.	D.O.W.	Gallipoli	9. 7.15
5477	Pte.	TOUT, Robert John	5 F.Amb.	D.O.W.	France	5. 2.17
2019	Pte.	TROON, Henry	4 F.Amb.	D.O.W.	Gallipoli	6. 5.15
9540	Pte.	TUCKER, Malcolm	1 L.H.F.Amb.	D.O.I.	Sinai	15. 7.16
92	Pte.	TURNER, Thomas Sydney	12 F.Amb.	D.O.C.	Victoria	17. 6.19
8504	Pte.	TWEDELL, John George	1 F.Amb.	D.O.W.	France	6.11.16
240	W.O.I.	TYRRELL, Leo Thomas	2 A.H.S.	D.O.I.	England	3.12.18
558	Pte.	URWIN, Ernest Reigh	14 F.Amb.	D.O.W.	Belgium	1. 8.17
3988	Pte.	VEIT, Gordon Henry	7 F.Amb.	D.O.I.	Gallipoli	5. 2.16
8357	Pte.	VENTEMAN, William Oliver	5 F.Amb.	K.I.A.	Belgium	20. 9.17
	Capt.	VERGE, Arthur	A.A.M.C.	D.O.I.	Gallipoli	8. 9.15
3692	Pte.	VERNUM, Joseph Albert	12 F.Amb.	K.I.A.	France	3. 4.18
231	Pte.	VICKERY, Thomas Leslie	14 F.Amb.	D.O.W.	France	14. 5.17
12394	Sgt.	VICKERY, James Sidney Swanton	10 F.Amb.	K.I.A.	France	26. 2.17
7909	Pte.	VON SCHILL, William Alfred	10 F.Amb.	D.O.W.	France	24. 8.18
16134	Pte.	WADDELL, Andrew John McArthur	9 F.Amb.	D.O.W.	Belgium	7. 6.17
13857	Pte.	WADE, Keith John	7 F.Amb.	D.O.W.	France	16.11.16
1853	Pte.	WAIN, John William	5 F.Amb.	K.I.A.	France	15.11.16
4482	Pte.	WAKE, Edward	3 A.G.H.	D.O.I.	Lemnos	18. 1.16
12419	Pte.	WAKELING, William Henry	10 F.Amb.	D.O.W.	France	23. 5.18

12266	Pte.	WILLIAMS, Humphrey (M.M.)	George	10 F.Amb.	D.O.W.	Belgium	1.10.17
9080	Pte.	WILLIAMS, James		8 F.Amb.	K.I.A.	France	30. 9.18
9439	Lt.-Col.	WILLIAMS, Maldwyn Leslie		1 F.Amb.	D.O.W.	France	3. 3.17
	Pte.	WILLIAMS, William Cox		14 F.Amb.	K.I.A.	Belgium	21. 9.17
14845	Surg.-Gen.	WILLIAMS, W. D. C.		A.A.M.C.	D.O.I.	Australia	10. 5.19
18934	Pte.	WILLIS, Eric Norman		7 F.Amb.	K.I.A.	France	3. 5.17
16194	Pte.	WILLIS, Henry Willyama		A.A.M.C.	D.O.I.	Egypt	28. 2.19
12436	Pte.	WILSON, Archie		6 F.Amb.	D.O.W.	France	1. 9.18
	Sgt.	WILSON, Alexander Mark (D.C.M., M.M. and Bar)		10 F.Amb.	K.I.A.	France	20. 5.18
8677	Pte.	WILSON, Harry Gilmore		1 F.Amb.	D.O.W.	France	23. 7.16
8117	Pte.	WILSON, John		2 C.C.S.	K.I.A.	France	22. 7.17
7912	Capt.	WILSON, John Sidney		15 F.Amb.	D.O.W.	France	9. 8.18
14990	Pte.	WILSON, Robert Hugh		2 F.Amb.	D.O.W.	Belgium	27.10.17
19420	Pte.	WILSON, William Joseph		14 F.Amb.	K.I.A.	France	30. 9.18
4081	Pte.	WINDOW, Norman Francis		A.A.M.C.	D.O.I.	France	26.10.18
2095	Pte.	WINZER, Luther Alfred		2 A.S.H.	D.O.I.	Lemnos	28. 8.15
13861	Pte.	WOOD, John William		1 A.G.H.	D.O.I.	Egypt	5. 3.16
8873	Pte.	WOODHAM, Frederick Martin		9 F.Amb.	K.I.A.	France	20. 8.18
17445	Pte.	WOODNUTT, Frank Bernard Martin		4 F.Amb.	D.O.W.	Belgium	6. 2.18
1974	Pte.	WOODVILLE, Roland Travers		A.A.M.C.	D.O.I.	England	13. 9.17
1102	Pte.	WOOTTON, Norman Edward		7 F.Amb.	K.I.A.	France	2. 9.18
61942	Pte.	WORDEN, Ernest Martyn		4 F.Amb.	D.O.W.	Gallipoli	10. 5.15
13374	Pte.	WRIGHT, Frank Evan		A.A.M.C.	D.O.I.	England	5. 2.19
		WUSTEMANN-Howgate, Edward	Albert	12 F.Amb.	D.O.W.	Belgium	30. 9.17
10335	L./Cpl.	YATES, Harold		14 F.Amb.	K.I.A.	France	27. 8.18
	Capt.	YOUNG, Robert Percy		R.M.O., 10 Bn.	K.I.A.	France	18. 9.18

Note. The utmost pains have been taken to make the list complete and correct, but "errors and omissions" cannot wholly be excluded.

APPENDIX No. 8

HONOURS AWARDED TO MEMBERS OF THE AUSTRALIAN ARMY MEDICAL SERVICES¹

BRITISH		BELGIAN	
K.C.B.	1	Médaille du Roi Albert ..	1
K.C.M.G.	3	Décoration Militaire ..	1
K.B.E.	2	Croix de Guerre	11
C.B.	6		
C.M.G.	22	EGYPTIAN	
C.B.E.	11	Order of the Nile	2
D.S.O.	103	FRENCH	
O.B.E.	45	Croix d' Officier	1
M.B.E.	8	Médaille Militaire	1
Bar to M.C.	9	Croix de Guerre	16
M.C.	140	Médaille des Epidemies	2
Bar to D.C.M.	1		
D.C.M.	54	ITALIAN	
Bar to M.M.	37	Order of St. Maurice and	
M.M.	637	St. Lazarus Cavalier ..	2
M.S.M.	91	Order of the Crown of	
Mentioned in despatches	811	Italy	1
		ROUMANIAN	
		Médaille Barbatie si	
		Gredinta	2
		SERBIAN	
		Order of the White Eagle	2
		Gold Medal	1
		Silver Medal	3
		 Order of St. John of Jerusa-	
		lem	3

¹ These figures have been supplied by the Officer i/c Base Records, First A.I.F. They do not include the honours awarded to members of the Australian Army Nursing Service, which will be found at the end of *Chap. 21*.

NOTE:

It was well known in the Australian Imperial Force¹ that the absence of the Victoria Cross from this list was due to the interpretation placed by the Australian Army Medical Corps on a direction that was issued by the British high command in France in August 1916. No copy of the original direction is available in Australia, but the form in which it reached the A.A.M.C. is indicated in an order published, in practically identical form, by the 1st and 2nd Divisions, A.I.F., on 30th and 29th August, 1916. The 1st Division's order ran: "Instructions have been received that in future the V.C. will only be given for acts of conspicuous gallantry which are materially conducive to the gaining of a victory. Cases of gallantry in life saving, of however fine a nature, will not be considered for the award of the V.C."

This order, which was repeated in a general instruction by the 2nd Division on 9th September, 1916, indicated a radical change in the policy for the award of the V.C. The reason for this was explained in a further order from G.H.Q. on September 29th:

"In future the Victoria Cross or other immediate reward will not be given for the rescue of wounded, excepting for those whose duty it is to care for such cases. Such attempts, more often than not, result in the death of the would-be rescuer and rescued. Moreover it depletes the fighting strength of units perhaps at most critical moments."

This instruction was passed to the Australian divisions, but the modification implied by the words "excepting for those whose duty it is to care for such cases" was not universally appreciated. On 2nd November, 1916 Sir Douglas Haig endeavoured to correct the "uncertainty" by the following explanatory instruction:

"The objects the Commander-in-Chief had in view are:

- (i) To ensure that the rescue of wounded should not be allowed to interfere with the use of every available man for any operations in course of execution.
- (ii) To avoid unnecessary loss of life.
- (iii) To discourage attempts to win honours for the sake of honours themselves.

"It is somewhat difficult to differentiate, but the Commander-in-Chief will be ready to consider for some reward such cases as:

- (a) Rescuing men buried in trenches.
- (b) Bringing wounded men back from a raid.
- (c) Any act specially ordered by an Officer to help stretcher-bearers in their duties.
- (d) Beyond this, any act which is *bona fide* and not in contravention of the spirit of the above provisos."

Possibly the intimation that such actions might be considered "for some reward" led to the impression that the original injunction still applied so far as the Victoria Cross was concerned. Whatever the explanation it is certain that in the A.I.F. acts of life-saving which, but for the orders above quoted, would have been recommended for and rewarded by the Victoria Cross were not so recommended. This does not alter the fact that the ideal of courage and devotion most approved

¹ See, for example, *Aust. Official History, Vol. IV, p. 498, footnote 28,*

in the Australian, as in the British, Medical Service was concerned more with promoting the safe "retreat" of the wounded than with the advance to victory.²

The following recommendations for "immediate" awards in the field are here quoted as typical both in form and as to the type of service held to be most deserving of such recognition.

Captain William Henry Collins, A.A.M.C., attached 37th Battalion, A.I.F.³

From the 11th to the 14th October, 1917, east of Ypres, he displayed the most conspicuous gallantry and devotion to duty.

On the night of the 11th-12th he established a R.A.P. at the rear of Augustus Wood, 300 yards behind the front line, improvising a German pill-box for the purpose. At daybreak on the 12th, a few minutes after zero, finding that the regimental stretcher-bearers were unable to locate the R.A.P. he went forward through an intense barrage of artillery and machine-gun fire and led the first party of stretcher-bearers to the aid post. At 8.30 a.m. on this morning whilst attending wounded in the open he was knocked down by a bursting shell which killed two men and wounded another. Without any hesitation he immediately resumed his dressing of the wounded. A few minutes later, a major and seven men were killed alongside, leaving Captain Collins with only two A.A.M.C. details to help. Despite these misfortunes he still courageously persevered with his work. During the night, owing to the collection of over fifty wounded at the aid post, he decided to excavate a dug-out, and he himself dug for over two hours under hostile shelling.

Shelling continued throughout the night, five of the wounded being killed, whilst twelve died from their wounds. During the whole time he went from one wounded man to another portioning out the food available and collecting blankets from the dead to cover the living.

On the afternoon of the 13th, 10th Infantry Brigade was relieved, but he remained at his post and arranged for the evacuation of the wounded as quickly as was possible, the post still being subjected to heavy fire. At midnight there were still fifteen wounded remaining, some of whom were dying. He remained until noon on the 14th, having seen the last man carried back.

For the whole period of 60 hours this officer showed a characteristic spirit of cheerfulness in the most depressing circumstances, and by his absolute disregard of personal safety kept up the spirits of the wounded. His splendid example of endurance and fortitude stimulated the surviving helpers to their utmost effort.

7907 Corporal (tempy. Sergeant) Hubert Clarence Thomas, 6th Australian Field Ambulance, A.I.F.⁴

On 7th November 1916 this N.C.O. was in charge of a party carrying a severely wounded man from Runners Post to Headquarters at Thistle Dump, near Basentin le Grand. When an enemy shell exploded alongside the party, killing the patient, 2 bearers, and wounding 4 others, his coolness, courage and resource was beyond praise; he dressed the wounded,

² See Vol. II, pp. 147, 177, and 282.

³ See Vol. II, pp. 233-40.

⁴ See Vol. II, pp. 85-6.

and secured their immediate removal to Headquarters. By his prompt action he saved the life of at least one of the wounded men.

This N.C.O. is at all times characterised by excellent work, great devotion to duty, and splendid courage.

5597 Staff-Sergeant Allan Kenneth Mackenzie, 1st Australian Light Horse Field Ambulance.⁵

This N.C.O. has shown marked ability, initiative and devotion to duty. Although he is a chronic malarial subject and was suffering during the recent operations, he insisted on remaining on duty. He was a tower of strength whilst the Tent sub-division of the Mobile Section of the 1st L.H.F.Amb. was established at Amman and acted as the Anzac Division Collecting Station from the evening of 25.9.18 to 1.10.18. As an assistant in the temporary operating theatre he was invaluable and rendered the greatest of assistance. He was the only S./Sgt. available and combined the duties of dispenser, theatre assistant and S./Sgt. nurse owing to the latter being absent. Whilst at Amman his work with the sick and wounded was very great and was of the highest order. He was frequently on duty for periods of 24 hours and would not rest until all his patients had been settled down.

On this tent sub-division rejoining the brigade there was a very large number of patients admitted, the majority being extremely ill from malignant malaria. Again he was in charge of a very small staff working under him, and this staff gradually dwindled down, owing to being affected with malignant malaria. His ability and devotion to duty were doubly taxed owing to so many of the personnel, other than his depleted staff, of this unit needing constant attention through serious illness.

This N.C.O. has 36 months active service to his credit and has been previously recommended by me on 5.9.18.

A "*periodical*" award (K.C.B.). Surgeon-General Neville Reginald Howse, V.C., C.B.

This officer, who was awarded the V.C. in South Africa, has been awarded the C.B. for the magnificent work which he did in connection with the actual landing of the Australian and New Zealand troops on the Gallipoli Peninsula. From thence onwards he was A.D.M.S. of the Anzac area, and as such did most magnificent work.

In October, 1915 he was recalled to Egypt to take up the appointment of D.M.S. of the A.I.F., but in view of the possibility of heavy and serious medical administrative work being required in connection with the evacuation, he was recalled to the Peninsula, where he made all the necessary medical arrangements for the Anzac area.

Since then he has been employed as D.M.S. of the A.I.F., and in this capacity has been responsible for the whole of the administration of the Australian troops in England, France and Egypt. This he has carried out with complete success, and with the absence of all friction. He so distinctly stands out for his magnificent work that I sincerely trust that this may now be fully recognised.

(Sgd.) W. R. BIRDWOOD.

⁵ See Vol. I, pp. 719-723.

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Ranks shown after surnames of officers and men are the highest attained by each; including those attained in the present war, so far as they can be ascertained.

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The letters A.M.S. (Army Medical Service) as applied to medical officers of the British Army are omitted in this index as having no significance other than a narrow social one.¹ The letters "T", "T.F.", and "S.R." are also omitted as irrelevant in a general medical history.

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¹ The use is, indeed, confused beyond confounding to any but officers of the Regular Army. The following is from an unimpeachable source: "The letters 'A.M.S.' (Army Medical Services) after an officer's name has been out of use in the British Medical Services for some considerable time. They were used a long way back in the history of the Royal Army Medical Corps. In the old days, when an officer was promoted above the rank of Lieut.-Colonel, he adopted the letters 'A.M.S.' after his name, denoting that he was employed in an administrative or Staff capacity. The same thing happens to-day to all officers of the Royal Army Medical Corps when promoted above Lieut.-Colonel, but now they use the term 'late R.A.M.C.' after their names."

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